Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Phelps Dodge (Laurel Hill) Site
Maspeth, Queens County
Site Number 2-41-002

January 2003

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Phelps Dodge (Laurel Hill) Inactive Hazardous Waste Site
Maspeth, Queens, New York
Site No. 2-41-002

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Phelps Dodge (Laurel Hill) class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Phelps Dodge inactive hazardous waste disposal site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Phelps Dodge site and the criteria identified for evaluation of alternatives, the NYSDEC has selected Alternative 5 which includes hot spot removal and off-site disposal; physical containment of all other soils; groundwater containment, extraction/treatment system, long term monitoring and institutional controls. The components of the remedy are as follows:

1. a remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance and monitoring of the remedial program.

2. excavation of PCB-contaminated soil (above 10 ppm) and petroleum-contaminated soil from OU-1A for off-site disposal.

3. consolidation of materials and grading in OU-4 areas to remove/level the existing hill.

4. construction of a site- specific cap as part of redevelopment of the site, consisting of asphalt pavement and building foundations on OU-1A, OU-2, OU-4 and OU-5.

5. installation of a groundwater containment, extraction and treatment system.

6. implementation of institutional controls by placement of deed restrictions to maintain the cap and to require a health and safety plan and a soil management plan and a storm water management plan for site development. Institutional controls will limit the use of groundwater as a potable or process water.

7. a long-term (30-year) groundwater monitoring program to evaluate the effectiveness of the groundwater containment, extraction and treatment system.

8. requirements of annual certification to confirm that the cap is maintained and that institutional and engineering controls are in place. This program will allow the effectiveness of the remedy to be monitored and will be a component of the Operation, Maintenance and Monitoring plan for the site

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

01/31/03 S/

Date Dale Desnoyers, Director
Division of Environmental Remediation

TABLE OF CONTENTS

SECTION **PAGE**

1: Summary of the Record of Decision 2

2: Site Location and Description 3

3: Site History 4

3.1 Operational/Disposal History 4
3.2 Remedial History 5

4: Site Contamination 7
4.1 Summary of Remedial Investigation 7
4.2 Interim Remedial Measures 13
4.3 Summary of Human Exposure Pathways 14
4.4 Summary of Environmental Exposure Pathways 15

5: Enforcement Status 15

6: Summary of the Remediation Goals 15

7: Summary of the Evaluation of Alternatives 16
7.1 Description of Remedial Alternatives 16
7.2 Evaluation of Remedial Alternatives 24

8: Summary of the Selected Remedy 27

9: Highlights of Community Participation 29

Tables
1a: Nature and Extent of Contamination in Groundwater
1b: Nature and Extent of Contamination in Soils
2: Remedial Alternative Costs

Figures
1. Site Location Map
2. Site Plan Map
3. Groundwater Contours
4. Alternative 4 Components
4a. Building 39 - Surface Soil PCB results
4b. Extent of Proposed Excavation
5. Alternative 5 Components

Appendix
Appendix A: Responsiveness Summary
Appendix B: Administrative Record

RECORD OF DECISION

Phelps Dodge (Laurel Hill) Site
Maspeth, Queens County
Site No.2-41-002
January 2003

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health has selected this remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Upland Area (Operable Units Nos. 1A, 2, 3, 4 and 5) of the Laurel Hill Class 2, inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, historical operations conducted at the former copper smelting and refining facility have resulted in the contamination of soil and groundwater at the site. Historical operations of manufacturing, smelting, refining and bulk storage of acids have resulted in the disposal of a number of hazardous wastes, including polychlorinated biphenyls or PCBs and inorganic metals at the site, some of which were released or have migrated from the site to surrounding areas, including the surface waters and sediments of the Maspeth and Newtown Creeks. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a potential threat to human health by ingestion of groundwater;
- a potential threat to human health by dermal contact and incidental ingestion of surface soil; and
- a threat to the environment associated with the contamination of soils and groundwater.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous wastes disposed at the Phelps Dodge Site has caused, the following remedy was selected for each of the Operable Units (OUs):

An Operable Unit (OU) represents a portion of the site which for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release, or exposure pathway resulting from the site contamination. Operable Unit Nos. 1A, 2, 3, 4 and 5 are defined as the on-site soils and groundwater. (See Section 3.2 of this document for a description of Operable Unit 6, which addresses the site impacted sediments of the Maspeth and Newtown Creeks).

OU-1A – Hot spot removal of PCB and -petroleum contaminated soil; placement of a site-specific cap consisting of asphalt or concrete (expected to be consistent with site redevelopment) to prevent direct contact with residual contaminated soils; a groundwater containment and treatment system consisting of

groundwater extraction wells, an on-site treatment system and a low permeability steel sheeting barrier wall adjacent to Newtown/Maspeth Creeks to intercept and treat contaminated groundwater before it enters the Creeks (Pumping test results and geotechnical data would be used to engineer the final design of the extraction and treatment system and the details of the steel sheeting barrier wall which would be installed downgradient of the extraction wells.);

OU-2 –Placement of a site-specific cap consisting of asphalt or concrete to prevent direct contact with contaminated soils;

OU-3– Institutional controls including deed restrictions to restrict site access (all or portions), restrict land usage to industrial/commercial and restrict groundwater use.

OU-4 – Leveling of the hill area; removal and consolidation of soil and construction debris onto OU-1A and OU-4 prior to placement of a site-specific cap on OU-4; and

OU-5– Placement of a site-specific cap consisting of asphalt or concrete to prevent direct contact with contaminated soils;

In addition to the remedies outlined above, institutional controls restricting the entire site to commercial/industrial use, disturbance below the cap, and groundwater usage to non-potable use would be implemented.

The selected remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals selected for this site, in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The Laurel Hill Site is located at 42-02 56th Road in a heavily industrialized area of Maspeth, Queens County, New York. The site area, consisting of eight parcels, is approximately 35.2 acres in size. The site location is presented in Figure 1.

The southerly portion of the site abuts Newtown and Maspeth Creeks which are contiguous. The Creeks are tidal and traverse in a westerly direction to the East River. Properties immediately to the west, north, and east are occupied by commercial and industrial businesses. The Long Island Railroad runs east-west dividing the site into northern and southern sections.

The site has a zoning classification of M3-1, heavy manufacturing district. The majority of the surrounding area is zoned industrial with all the areas along Newtown Creek designated as M3, which allows for heavy industrial uses. There are two areas in the vicinity of the site that are zoned as residential (R4), which are being used as cemeteries. One is located approximately 300 feet west of Parcel 5, and the other is located approximately 2,000 feet northeast of Parcel 4.

The upland area of the site has been divided into five Operable Units (a sixth Operable Unit was developed for the sediments and surface water in Newtown/ Maspeth Creeks and is not considered part of this ROD). The division of the upland area into the five Operable Units was based on the physical separation of five distinct areas via roads and the railroad running through the property as well as the fact that all previous investigations were conducted in a small area of Operable Unit 1A.

Even though, the site was divided into five Operable Units for ease of investigation, this ROD addresses all of them as follows:

1) Operable Unit 1A (OU-1A) encompasses the area in Parcel 1 and Parcel 8;
2) Operable Unit 2 (OU-2) encompasses the area in Parcel 2;
3) Operable Unit 3 (OU-3) encompasses the area in Parcel 3 and Parcel 7;
4) Operable Unit 4 (OU-4) encompasses the area in Parcel 4 and Parcel 6; and
5) Operable Unit 5 (OU-5) encompasses the area in Parcel 5.

A general site plan is presented on Figure 2 and Figure 3.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The following summarizes historical site operations:

- G.H. Nichols & Company operated a copper smelting plant, phosphate works, and sulfuric acid plant on OU-1A as early as 1888;

- The chemical portion of the business was taken over by AlliedChemical Company/ General Chemical Company which operated in OU-2, 3, 4 and the west part of OU-1A;

- The southern portion of OU-1A was originally part of Maspeth and Newtown Creeks but was filled in during the late 1800s - early 1900s to develop the site ;
- Smelting operations were conducted by the Nichols Copper Company in the southeast portion of OU-1A around 1913;

- General Chemical Company processed primarily lead and aluminum ore on the western part of OU-1A in the early 1900s;

- Two large aboveground storage tanks containing oil (17,000 gallon ASTs) were installed in the southeast corner of OU-1A in the early 1920s;

- The last industrial owner, Phelps Dodge purchased Nichols Copper Company in the late 1920s and expanded operations and undertook a significant rebuilding program that was completed in 1936;

- A copper sulfate plant was constructed in OU-5 prior to 1928. The operation was expanded to produce tribasic copper sulfate and copper sulfate pentahydrate on OU-4;

- Silver and nickel refining were conducted on OU-5;

- Smelting operations were discontinued in approximately 1960 and the associated buildings were razed in the early 1960s;

- Manufacturing operations were discontinued in 1983 and Phelps Dodge removed equipment and cleaned out the buildings in 1984;

- The United States Postal Service USPS purchased the site in 1986. Phelps Dodge re-acquired the property in 1997; and

- All buildings and structures were razed to ground level between September 1999 and June 2000.

The generation and management of waste materials on the site prior to the 1970s is unclear. The majority of the wastewaters from the electrolytic refinery process were used as feed stock in the copper sulfate plant, while one specific waste stream was shipped off-site for precious metal recovery (gold and silver). The wastewater generated from other operations may have been originally discharged into Newtown Creek. In the 1970s, wastewater treatment consisting of neutralization, settling and filtration was installed. A metal hydroxide sludge, generated from the wastewater treatment system at a reported rate of 10 tons per month, was dewatered in an unlined earthen lagoon in OU-1A and was shipped to a smelter in Arizona for reclamation. Furnace slag was buried on portions of the site, particularly to fill in wet areas and the Creeks.

3.2: Remedial History

The site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites (the Registry) in 1980 as a Class 2a Site. Class 2a is a temporary classification assigned to sites that have inadequate and/or insufficient data for inclusion in any of the other classifications.

In December 1986, the site was reclassified in the Registry from Class 2a to Class 2. Class 2 signifies that a significant threat to the public health and/or the environment exists and action is required.

During 1986, a Remedial Action Plan was prepared to address removal of approximately 6,500 cubic yards of soils from the southeastern portion of OU-1A that had concentrations of cadmium and lead above the criteria being used by the NYSDEC for classifying a hazardous waste. By October 1987, approximately 12,000 cubic yards of soil and concrete were excavated and disposed of off site. At that time, work was halted as soils with concentrations above the criteria were encountered below the groundwater table and additional investigation was undertaken to evaluate potential groundwater

contamination.

During the period from September 1999 to June 2000, decommissioning of the remaining structures was undertaken. Decommissioning involved conducting interim remedial measures (IRMs) prior to general demolition activities.

During site decommissioning, approximately 5,200 tons of PCBs contaminated waste, 3,400 tons of hazardous waste, 4,800 tons of asbestos containing material (ACM) and 8,500 tons of non-hazardous waste were disposed of off site. All structures have been removed from the site. IRM activities are explained in detail in Section 4.2 below.

After completion of RI Investigations and the FS report (May 2002), it was clear that sediment contamination of the Maspeth and Newtown Creeks necessitated further investigation. Given that the sediments need further investigation and this investigation would take additional time and effort, the NYSDEC decided to split the site administratively into two sections: one section is the on-site, upland soils and groundwater (including OUs 1A, 2, 3, 4 and 5); the other section is the off-site surface water and sediments of the Newtown and Maspeth Creeks and is referred to as Operable Unit No. 6 (OU-6). Dividing the site into these Operable Units allows the NYSDEC to select a remedy for the upland soils and groundwater contamination without delay while additional investigation is conducted for the sediments and surface water.

The remedy selection process for OU6 will be the same as the process being followed for on-site remediation of upland soils and groundwater. An RI/FS will be completed specifically addressing sediment and surface water issues at the site and a ROD for OU-6 will be prepared by the NYSDEC after the public review and comments.

3.2.1: Site Investigation History

Several environmental investigations have been conducted at the site since 1987. The investigations have included an asbestos survey, a soil gas survey, and sampling and analysis of surface and subsurface soil, debris, paint, concrete surfaces, groundwater, surface water, and Creek sediments. Various parties have conducted remedial and investigative activities at the site. A summary of the chronology of these investigations is presented in Appendix B of this document.

- An initial investigation done in 1985 on behalf of the USPS determined that a 3-acre portion of the site known as OU-1 contained elevated levels of metals (lead and cadmium). OU-1 is 3 acres of property found to be contaminated in 1986 and is located at the south/eastern portion of the site within OU-1A;

- 1986 soil investigations further defined the extent of contamination in OU-1 and a Remedial Action Plan (RAP) was prepared. An Order of Consent was executed between NYSDEC and Phelps Dodge Refining Corp. in February 1987 for implementation of the RAP;

- A Phase 1 Investigation was conducted in September 1990 to identify any existing or potential releases of hazardous materials;

- A groundwater and surface water monitoring program was implemented on behalf of Phelps Dodge which resulted in a report "Supplemental Remedial Program - Final Report" in March 1992. Phelps Dodge also prepared a Focused Feasibility Study (FFS) and recommended that previously excavated areas in Parcel 1 be backfilled and capped;

- The New York City Department of Environmental Protection (NYCDEP) considered the site as a potential location for a sludge composting facility and conducted an environmental investigation in 1992. This investigation included collection of extensive data including a structural building evaluation, geophysical investigation, PCB sampling, lead paint sampling, surface and subsurface soil sampling, marine sediment sampling and asbestos sampling in areas consisting of OU-1, -2 and -3;

- In 1993/1994, additional groundwater investigation was conducted and a Feasibility Study and Site Remediation report dated May 1994 recommended excavation of PCB hot spots and capping of the site;

- In 1999/2000, Phelps Dodge undertook IRM activities at the site. These included site decommissioning, asbestos abatement, utilities abandonment, demolition of buildings and structures to ground level, and segregation, removal and disposal of waste streams including contaminated soil, PCB wastes, bricks, asbestos and old machinery;

- In 1999/2000, Phelps Dodge conducted a Preliminary Site Assessment (PSA) investigation in OUs-2, 3, 4 and 5 to determine if hazardous waste contamination was present and if there was a need for conducting an RI/FS for one or more of these Operable Units;

- In November 1999, Phelps Dodge prepared a Draft Remedial Investigation (RI) Report for OU-1A that included both historical and current data;

- Phelps Dodge prepared a Final RI Report in December 2000. The RI characterized the nature and extent of hazardous constituents for OU-1A and evaluated the risks to public health and the environment;

- The PSA Report and Supplemental PSA Reports (December 2000) presented the nature and extent of contamination for OUs-2, 3, 4, and 5; and

- Phelps Dodge prepared a Feasibility Study Report for OU-2, 3, 4, and 5 in January 2001, which was revised in May 2002.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, Phelps Dodge has recently completed a Remedial Investigation/Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the upland portions of the site.

Investigations under the 1999 Consent Order at the site concluded in 2000. The results of the investigations were compiled into the following reports that describe the field activities and findings of the RI in detail:

1) Remedial Investigation Report, Operable Unit 1A, dated November 2000

2) Preliminary Site Assessment Report, Operable Units 2, 3, 4, and 5, dated February 2000; and

3) Supplemental Preliminary Site Assessment Report, Operable Units 2, 4, and 5 dated December 2000.

These reports together constitute the RI for all upland Operable Units of the site. The RI included the following activities:

- Installation of soil borings and monitoring wells to analyze soil and groundwater as well as to delineate the physical properties of the soil and the hydrogeologic conditions;

- Collection of surface water and sediment samples from Newtown Creek for analysis to evaluate potential impacts from the site;

- Collection of ambient air samples for analysis. A total of ten air samples were collected, five upwind and five downwind, during intrusive investigation activities. Samples were analyzed for volatile organic compounds (VOCs), total suspended particulates and metals. Concentrations of contaminants in the ambient air samples were below applicable SCGs;

- Implementation of a soil gas survey to evaluate the distribution of VOCs in the soil. Samples were collected on 150 feet intervals and were analyzed utilizing an organic vapor analyzer. At 34 locations the samples were collected at a single depth (3 to 5 feet) and at 18 locations, samples were collected at depths of 3 to 5 feet below ground surface (bgs) and at 2 feet above the groundwater table. These data were used to select locations for soil and groundwater sampling;

- Monitoring of groundwater and Creek water levels to evaluate impacts of tidal fluctuations on groundwater flow at the site;

- Excavation of test pits to investigate potential underground storage tanks. No underground storage tanks were encountered; and

- Collection of soil and concrete samples for PCB analysis in various buildings.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data were compared to SCGs. Groundwater, and drinking water SCGs identified for the Laurel Hill Site are based on the NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of the New York State Sanitary Code. For soils, the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides Recommended Soil Cleanup Objectives (RSCOs) for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils, site-specific background concentration levels can be considered for certain classes of contaminants.

Guidance values for evaluating contamination in sediments are provided by the NYSDEC "Technical Guidance for Screening Contaminated sediments". For air, the analytical results were compared to the values presented in NYSDEC Air Guide 1.

Based on the RI results in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More detailed information is available in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) or parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The site is located in an industrial/commercial area of Queens adjacent to Newtown Creek and its tributary Maspeth Creek. The topography of most of the site is relatively flat with a minimal southerly slope, towards Newtown Creek. A steeper slope and a hill are present on the north side of the site. A portion of the site consists of land resulting from placement of fill material along the north banks of the Creeks. Newtown Creek is a primary receptor of surface water runoff and groundwater discharge in the area. Tidal influences in Newtown Creek average approximately 4 feet. These Creeks are designated Class SD surface waters or saline-containing waters.

Former building foundations, concrete floor slabs or pavement cover more than 70% of the site.

The site is located in the Atlantic Coastal Plain physiographic province. This province is composed of interbedded layers of sand, clay and marl. The site is underlain by a fill unit comprised of soil, wood,

concrete, bricks, and slag. Beneath the majority of OU-1A, the fill unit is hydraulically connected to an underlying naturally occurring silty sand/silt unit. A peat mat and a clay unit separate the fill unit and the silty sand/silt unit from the deeper sand and gravel unit in the OU-1A area. In the northwestern portion of the site, the peat mat and clay units are absent and the fill unit directly overlays the sand and gravel unit.

Based upon regional geologic information, crystalline bedrock occurs at a depth of approximately 100 feet bgs. Bedrock was not encountered during the RI. Groundwater flow beneath the site occurs under unconfined conditions at depths ranging from two feet bgs in OU-1A to 30 feet bgs in OU-4. Groundwater generally flows in a southerly direction towards Newtown and Maspeth Creeks and the groundwater flow patterns are generally similar under low and high tide conditions. The groundwater beneath the site is classified as Class GA for potable waters and is present in a series of unconsolidated deposits of sand, gravel and clay. The Jamaica Water Supply Company well field, the closest area of groundwater usage, is approximately 5 miles east and upgradient of the site and is not influenced by groundwater conditions at the site. Figure 3 shows general groundwater level contours and the direction of groundwater flow at the site.

4.1.2: Nature of Contamination

During the RI, numerous soil, groundwater, soil gas, ambient air, sediment and surface water samples were collected to characterize the nature and extent of contamination. All of the analytical results, including results from previous investigations, are presented in the RI Report for OU-1A and the Preliminary Site Assessment (PSA) Report and Supplemental PSA Report for OUs-2, 3, 4 and 5. The main categories of contaminants that exceed their SCGs are inorganics (metals), semivolatile organic compounds (SVOCs) and polychlorinated biphenyls (PCBs)

The inorganic contaminants of concern are primarily antimony, arsenic, copper, and lead. The SVOCs of concern are petroleum constituents, including benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene and phenanthrene.

4.1.3: Extent of Contamination

Table 1a and 1b summarize the nature and extent of contamination for the contaminants of concern in groundwater and soil, respectively, and compares the data with the SCGs for the site. The following are the media that were investigated and summaries of the findings of the investigation:

Soil

The NYSDEC RSCOs, as defined in Section 4.1, were used as screening levels for evaluation of the soils analytical results. Exceedances of RSCOs occur in surface and subsurface soils for polycyclic aromatic hydrocarbons (PAHs) and metals. At certain locations, concentrations exceeding RSCOs were detected for PCBs, primarily in surface soils. Surface and subsurface soil sampling results are summarized in Table 1b.

Surface Soils: The majority of the site is covered with asphalt or concrete pavement or former building foundations. During the RI, surface soil samples were collected from the various OUs. In locations where concrete or asphalt is present, the surface soil samples were collected from directly beneath the concrete/asphalt. Organic parameters with concentrations above the soil RSCOs are primarily PAHs and PCBs.

Inorganic parameters with concentrations exceeding the soil RSCOs in OU-1A are antimony (maximum of 200 ppm in soil sample SS-23; RSCO of site background -SB), arsenic (maximum of 367 ppm in soil sample SS-19; RSCO of 7.5 ppm), barium (maximum of 509 ppm at SS-8; RSCO of 300 ppm), cadmium (maximum of 49 ppm in SS-15; RSCO of 10 ppm), copper (maximum of 160,000 in SS-16; RSCO of 25 ppm), lead (maximum of 4360 ppm in SS-20; RSCO of 400 ppm), mercury (maximum of 3.3 ppm at SS-3; RSCO of 0.1 ppm), nickel (maximum of 620 ppm at SS-23; RSCO of 13 ppm), selenium (maximum of 179 ppm in SS-23; RSCO of 2 ppm) and zinc (maximum of 12,100 ppm at SS-8; RSCO of 20 ppm). Most of these exceedances were under the floor slabs of former production areas. A total of 25 surface soil samples were tested for the presence of hazardous waste using the Toxicity Characteristic Leaching Procedures (TCLP). Parameters with concentrations above the characteristic hazardous waste limits are cadmium (up to 1.3 ppm vs. TCLP limit of 1 ppm) in two samples, and lead (up to 11.9 ppm vs. TCLP limit of 5 ppm) in five samples.

Throughout OU-1A, SVOCs including benzo(a)anthracene (RSCO of 0.224 ppm), benzo(a)pyrene (RSCO of 0.061 ppm), benzo(b)fluoranthene(RSCO of 1.1 ppm), dibenzo(a,h)anthracene (RSCO of 0.014 ppm) were detected at concentrations above the RSCOs. In OU-1A, surface soils with the highest PAH detections were SS-20 and SS-23, which are east of former Building 54. With the exception of the former electrolytic tank area, the highest concentration of PCBs was 9.6 ppm (SS-17 under the floor slab of former Building 36). In areas of the former electrolytic tanks, PCBs were detected at concentrations (maximum of 1,100 ppm) above the RSCOS of 1 ppm surface or 10 ppm subsurface soils.

In OU-2 and OU-5, SVOCs including benzo(a)anthracene (maximum of 10 ppm at OW10-99), benzo(a)pyrene (maximum of 8.5 ppm at OW10-99), benzo(b)fluoranthene (maximum of 9.8 ppm at 011), indeno(1,2,3-cd)pyrene (maximum of 5.7 ppm at OW10-99) and dibenzo(a,h)anthracene (maximum of 2.3 ppm at OW10-99) and metals including lead (maximum of 4,850 ppm at 011), arsenic (maximum of 4,860 ppm at BH32-00), and copper (maximum of 187,000 ppm at 013) were detected at concentrations above the RSCOs in the surface soils throughout the OUs. PCBs were detected at concentrations above the NYSDEC TAGM levels of 1 ppm at several locations in OU-5 (maximum of 3.9 ppm at OW11-99).

In OU-3, SVOCs including benzo(a)pyrene (maximum of 1.7 ppm at BH8-99) and dibenzo(a,h)anthracene (maximum of 0.42 ppm at BH8-99) and metals including arsenic (maximum of 23.4 ppm at BH8-99) were detected in the surface soil samples at concentrations above the RSCOs.

In OU-4, SVOCs, including benzo(a)anthracene (maximum of 9.7 ppm at 010), benzo(a)pyrene (maximum of 9.2 ppm at 010), benzo(b)fluoranthene (maximum of 12 ppm at 010), and dibenzo(a,h)anthracene (maximum of 3 ppm at 010), and metals, including arsenic (maximum of 180 ppm

at BH17-00), lead (maximum of 2,060 ppm at 010) and copper (maximum of 77,000 ppm at 003), were detected in the surface soil samples at concentrations above the RSCOs. The concentrations of these parameters at the majority of the sampling locations in OU-4 are similar to background concentrations for the area. Isolated areas of OU-4 had concentrations of the above parameters that exceeded RSCOs. Two sampling locations (003 and 010) had PCBs at concentrations above the NYSDEC TAGM level for surface soil (1 ppm).

Subsurface Soils: Subsurface soil samples were collected from each of the OUs. The highest PAH concentrations occur at soil boring PD-43 at a 2 to 4 foot depth near former Building 251 in OU-1A. Boreholes with metals concentrations above RSCOs were evident across the site. Parameters with TCLP concentrations above the hazardous waste thresholds are cadmium, lead or mercury in 32 of the 74 samples collected. Metals were detected at concentrations exceeding the site RSCOs to depths of 27 feet bgs.

Subsurface soil in OU-1A: SVOCs including benzo(a)anthracene (maximum of 49.8 ppm at PD-43), benzo(a)pyrene (maximum of 36.2 ppm at PD-43), benzo(b)fluoranthene (maximum of 74 ppm at PD-43), dibenzo(a,h)anthracene (maximum of 2.8 ppm at P1), and indeno(1,2,3-cd)pyrene (maximum of 13 ppm at PD-43) were detected in the subsurface soil samples at concentrations above the RSCOs. The SVOCs were generally found at isolated locations and in samples collected from within 4 feet of the ground surface. PCB concentrations above RSCOs were localized to shallow soil samples (less than 3.5 feet bgs) at soil borings PD-29 (16 ppm) and PD-30 (11 ppm).

Former Electrolytic Tank Area: PCBs were detected at concentrations above the RSCOS in subsurface soil samples collected from the Former Electrolytic Tank areas to depths of 4 feet bgs. All 45 composite surface soil samples exceeded the PCB RSCO of 1 ppm with the highest concentration detected in Area U (in OU-1A) at 1,100 ppm. PCBs in concrete samples in former Building 39 were detected at concentrations up to 79 ppm and in Area U up to 94 ppm. Subsurface locations indicated PCB presence at concentrations of up to 67 ppm at Grid 27 (Area U-Figure 4 a).

Subsurface soil in OU-2 and OU-5: Benzo(a)pyrene (at some locations) and metals - antimony (maximum of 1,080 ppm at BH28-00), lead (maximum of 52,400 ppm at BH11-00), arsenic (maximum of 3,670 ppm at OW-14-00) and chromium (maximum of 1,330 ppm at OW13-00) were detected in the subsurface soil samples at concentrations above the RSCOs. Metals were detected at concentrations exceeding the RSCOs to depths of 16.5 feet bgs in OU-2 and 12 feet bgs in OU-5.

Subsurface soil in OU-3: Exceedances of NYSDEC RSCOs were detected in subsurface soils at three locations in OU-3. Parameters with concentrations above NYSDEC RSCOs include PAHs (benzo(a)pyrene (maximum of 0.83 ppm at BH8-99) and metals (primarily antimony (maximum of 6.6 ppm at BH8-99), arsenic (maximum of 45.8 ppm at BH8-99), copper (maximum of 3,280 ppm at BH8-99), and lead (maximum of 891 ppm at BH8-99).

Subsurface soil in OU-4: Benzo(a)pyrene (maximum of 0.24 ppm at OW8-99) and metals (lead

(maximum of 7,420 ppm at BH22-00) and arsenic (maximum of 21 ppm at BH15-00)) were detected in the subsurface soil samples at concentrations above the RSCOs.

Sediments

The sediments in the Newtown Creek and Maspeth Creek adjacent to the Laurel Hill Site are being addressed as an individual Operable Unit (OU-6) and are not included in this ROD.

Surface Water

The surface waters in the Newtown Creek and Maspeth Creek adjacent to the Laurel Hill Site will be addressed in a separate Operable Unit, OU-6.

Groundwater

Groundwater samples have been collected from monitoring wells installed in each of the OUs. Groundwater monitoring was undertaken during January 1985, October – December 1988, July 1992, December 1993, May 1994, July-August 1999 and September 2000.

During 1999/2000, VOCs including benzene (maximum of 6 ppb at PDW-7-99 in OU-1A vs groundwater standard of 1 ppb), 1,1,1-trichloroethane (maximum of 210 ppb at OW-14-00 in OU-5 vs groundwater standard of 5 ppb) and 1,1-dichloroethane (maximum of 11 ppb at OW-14-00 in OU-5 vs groundwater standard of 5 ppb) were detected. SVOCs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k) fluoranthene, chrysene, bis(2-ethyhexyl) phthalate and indeno(1,2,3-cd)pyrene) were detected at well PDW-36 in OU-1A at concentrations above the Class GA groundwater standards. Tetrachloroethene (maximum of 26 ppb) was detected at concentrations above the Class GA groundwater standard (5 ppb) in the two upgradient wells (OW12-99 and OW15-00).

Inorganics, including primarily antimony detected up to 320 ppb (GA Standard 3 ppb), lead up to 847 ppb (GA Standard 25 ppb), arsenic up to 938 ppb (GA Standard 25 ppb), cadmium up to 101 ppb (GA Standard 5 ppb), copper up to 54,200 ppb (GA Standard 200 ppb), iron up to 109,000 ppb (GA Standard 300 ppb), magnesium up to 289,000 ppb (GA Standard 35,000 ppb), manganese up to 3,560 ppb (GA Standard 300 ppb), nickel up to 61,900 ppb (GA Standard 100 ppb), selenium up to 1,150 ppb (GA Standard 10 ppb), thallium up to 6.8 ppb (GA Standard 0.5 ppb), and zinc up to 28,500 ppb (GA Standard 2,000 ppb) were detected in the monitoring wells located in OU-1A, OU-2 and OU-5 at concentrations above the Class GA groundwater standards. In OU-4 cadmium, copper, iron, magnesium, manganese, nickel, selenium, and sodium were detected at concentrations above the Class GA groundwater standards.

Upgradient groundwater also contains some inorganic constituents at concentrations above the Class GA groundwater standards (e.g. iron at 2,330 ppb, magnesium at 35,300 ppb, manganese at 562 ppb, selenium at 16.6 ppb and sodium at 24,400 ppb). No PCBs were found in groundwater above Class GA groundwater standards. The groundwater at the site is not used as a potable water supply and is not expected to be used as a potable water supply in the future due to the elevated inorganics and the close proximity of the site to saline waters. The site groundwater is not expected to impact any existing potable

water supplies. The nearest potable groundwater supply wells (Jamaica Water Wells) are located more than 5 miles east and upgradient of the site. These results are summarized in Table 1a.

Air

A total of ten air samples were collected, five upwind and five downwind, during intrusive investigation activities. Samples were analyzed for VOCs, total suspended particulates and metals. Exceedances of ambient air screening levels were not detected.

Soil Gas

Elevated levels of methane and total non-methane VOCs were detected in several locations which corresponded with the locations of former underground storage tanks and petroleum storage and handling facilities. As a result, these areas were further investigated by installing boreholes and monitoring wel

4.2: Interim Remedial Measures

As noted above, an interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

During the time period from September 1999 to June 2000, Phelps Dodge completed IRM/demolition activities at the site. The purpose of the IRM/demolition program was to remove contamination from within, or associated with, the existing buildings and to demolish the buildings to ground level.

IRMs conducted at the site included the following:

- Securing the site, disconnecting and plugging utilities to be abandoned and cleaning the sewers;
- Removal and off-site disposal of PCB-contaminated, asbestos contaminated and other hazardous waste materials;
- Cleaning of furnace brick, smoke stacks and concrete from former electrolytic tanks prior to demolition;
- Consolidation, characterization, and off-site disposal of debris piles, abandoned equipment, ductor, tanks and process piping contents, impounded water, and scrap metal;
- Removal, consolidation, and characterization of electrical equipment;
- Completion of test pit excavations at potential underground storage tank (USED) locations. No ASTS were found at the site; therefore, abandonment/closure of ASTS was not performed; and
- Transportation and off-site disposal of waste materials.

General demolition activities included the demolition of on-site structures to ground floor level. Demolition materials were segregated based on the materials' suitability for recycling and the method of disposal.

Materials suitable for use as on-site fill included uncontaminated brick, concrete, and asphaltic concrete. These materials were used to backfill sumps, pits, and basements. Materials suitable for off-site recycling include d equipment, tanks, and structural steel. These materials were segregated and transported to off-site recycling facilities. The balance of the demolition debris, which consisted primarily of wood and miscellaneous paper products and glass, was segregated and transported to off-site disposal facilities.

During decommissioning, approximately 5,200 tons of PCB contaminated waste, 3,400 tons of hazardous waste, 4,800 tons of asbestos containing material (ACM) and 8,500 tons of non-hazardous waste was disposed of off site. An IRM/Demolition and Back grading Final Report was submitted to the NYSDEC in December 2000.

4.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 7.0 of the RI report for OU-1A, Section 5.0 of the Supplemental PSA Report for OU-2, OU-3, OU-4 and OU-5, and in Section 3.2.6.2 of Feasibility Study Report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events. Pathways that are known to or may exist at the site include:

- Dermal contact and incidental ingestion of contaminated surface soil;
- Ingestion of contaminated groundwater; and
- Inhalation of airborne particulates originating from surface soil.

Ingestion of contaminated groundwater has been eliminated as an exposure pathway because the area utilizes public water.

Exposure to contaminated surface soil would be eliminated through installation of a site-specific cap preventing direct contact.

Potential exposure to contaminated sediments and surface waters in the Newtown/Maspeth Creeks adjacent to the Laurel Hill Site will be addressed in a separate Operable Unit, OU-6.

4.4: Summary of Environmental Exposure Pathways

The site is located in a heavily industrialized area. Impacted environmental resources that are known to exist at the site include:

- contamination of surface and subsurface soils above RSCOs; and
- contamination of groundwater above class GA groundwater standards.

As described previously, the Newtown/Maspeth Creeks sediments and surface waters are being dealt with

as a separate Operable Unit and will be addressed in a separate ROD.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and the Phelps Dodge Refining Corporation entered into a Consent Order on February 11, 1987. The Order obligates Phelps Dodge Refining Corporation to implement an investigation and remedial program for 3 acres (OU-1) of the Phelps Dodge property. The NYSDEC and the Phelps Dodge Refining Corp. entered into a second consent order on July 6, 1999 which obligates the Phelps Dodge Refining Corporation to implement a RI/FS remedial program for the entire Phelps Dodge property. Upon issuance of the ROD the NYSDEC will approach Phelps Dodge Refining Corporation to implement the selected remedy under an Order on Consent.
The following is the chronological enforcement history of this site.

Date	Index No.	Subject of Order
2/11/1987		Remedial Program
7/6/1999	W2-0188-8152	RI/FS (OU 1A, 2, 3, 4 & 5)
6/18/2002	D2-0001-02-06	RI/FS (OU 6)

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process outlined in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all standards, criteria and guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for the Laurel Hill Site are:

- Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYSDEC Class GA Ambient Water Quality Criteria;

- Eliminate, to the extent practicable, the potential for direct human or animal contact to contaminants present in soils at concentrations above the RSCOs;

- Reduce or prevent, to the extent practicable, the potential for migration of contaminants from soils to the groundwater beneath the site;

- Eliminate, to the extent practicable, the potential for migration of contaminants from soils and

groundwater to Newtown/Maspeth Creeks surface water or sediments either by runoff or through the groundwater transport mechanism;

- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants to the waters of the State; and

- Minimize risks/impacts from the site groundwater to human health and the environment.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the extent practicable. Potential remedial alternatives for the Laurel Hill Site were identified, screened and evaluated in the report entitled, "Feasibility Study Report Operable Unit Nos. 1A, 2, 3, 4, and 5", dated May 2002.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site. The primary goal of addressing contaminated soils at the site is to prevent exposure to soils with concentrations exceeding the RSCOs. Several of the remedial alternatives considered for soils (i.e. capping alternatives) would also reduce infiltration and may ultimately result in improved groundwater quality at the site. The primary goal of addressing groundwater contamination at the site is to prevent exposure to the groundwater through ingestion and to prevent contaminant migration from the site to Newtown/Maspeth Creeks via the groundwater flow pathway. Measures taken to address the remedial goals for soils (e.g. capping alternatives) would reduce potential leaching of contaminants from soils to groundwater and would result in improved groundwater quality at the site and lessen any impacts of groundwater on surface water quality.

Alternative 1: No Further Action

Present Worth:	$ 764,900
Capital Cost:	$ 0
Annual O&M:	$ 61,600
Time to Implement	6 months - 1 year

This alternative recognizes remediation of the site conducted under previously completed removal actions and IRMs. Only continued monitoring would be necessary to evaluate the effectiveness of the remediation

completed under the IRMs.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Natural recovery for VOC contaminants would presumably occur by multiple mechanisms including:

- dilution by uncontaminated water;
- biological degradation;
- chemical degradation;
- volatilization; and
- photo degradation.

Long-term groundwater monitoring would be implemented to monitor for potential changes to the groundwater quality. Groundwater monitoring would include annual sampling of designated monitoring wells in a network of approximately 20 wells for target compound list (TCL), VOCs and SVOCs, target analyte list (TALL) metals and PCBs. The monitoring well network would include wells located in all OUs. An annual report would be submitted to NYSDEC. In conjunction with the annual sampling event, the site would be inspected to ensure that perimeter fencing was secure and determine if there were any changes to the condition of the site relative to the remedial program. Inspection information would be presented in the annual monitoring report.

Costs for Alternative 1 are for annual groundwater monitoring for a period of 30 years. There would be no direct capital costs. Annual monitoring costs would be $61,600 which includes an allowance for periodic evaluation of site conditions.

Alternative 2: Institutional Controls

Present Worth:	$ 1,265,000
Capital Cost:	$ 57,500
Annual O&M:	$ 97,300
Time to Implement	6 months - 1 year

Alternative 2 would involve implementation of institutional controls to restrict site access (all or portions), restrict land usage to industrial/commercial, impose deed restrictions, and restrict all groundwater use Under this alternative physical barriers such as fences would continue to be used pending site redevelopment to prevent unauthorized entry.

Institutional controls including land use restrictions would be structured to ensure that areas of the site would only be developed with appropriate safeguards in place. Land use restrictions (deed restrictions) would be implemented to maintain the site and would require a health and safety plan and a soil management plan in those instances where excavation for site development would potentially expose human

receptors to impacted soil. Institutional controls would limit the use of groundwater as a potable or process water from the affected areas without the necessary water quality treatment as determined by the applicable agencies.

The property owner would complete and submit to the NYSDEC an annual certification. This submittal would contain certification that the institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective. Since hazardous soils would remain on site, the site would remain as Class 2.

The storm water management system would include an on-site subsurface storm sewer system to aid in conveying surface water runoff from the site. All components of the storm water management system would be designed to comply with applicable State and municipal requirements.

Long-term (30 years) groundwater monitoring would be implemented to assess on going groundwater conditions and to monitor for potential changes to the groundwater quality. Groundwater monitoring would include annual sampling of designated monitoring wells in a network of approximately 20 wells for TCL, VOCs and SVOCs, TALL metals and PCBs. The monitoring well network would include wells located in all OUs. The exact number of wells would depend upon the remedial design investigation. An annual report would be submitted to NYSDEC. If a statistically significant increase in contravention of groundwater standards caused by on-site soils were identified, further investigation/ evaluation would be undertaken to determine the cause of the increase, and a groundwater collection and treatment system along Newtown/Maspeth creeks would be required.

The estimated capital costs for Alternative 2 is approximately $50,000. The expected O&M costs would be approximately $53,600 for annual groundwater monitoring, $11,000 per year for institutional controls, and $20,000 per year for fence maintenance.

Alternative 3: Physical Containment/ Institutional Controls

Present Worth:	$ 7,592,000
Capital Cost:	$ 4,970,000
Annual O&M:	$ 211,500
Time to Implement	6 months - 1 year

Alternative 3 would involve physical containment of soils with chemical concentrations above the RSCOs utilizing a site-specific cap, (asphalt or concrete) on OUs-1A, 2, 4 and 5. A cap is not needed on OU-3, as the chemical concentrations in the soils are generally less than the RSCOs. Consolidation of materials and grading would be necessary to allow capping in OU-4 due to the large hill that currently occupies the northeastern portion of this OU.

The following describes the characteristics for each Operable Unit:

- OU-1A: encompasses an area of approximately 25 acres (1,100,000 square feet). Soils with chemical concentrations above RSCOs are present throughout OU-1A. Currently, approximately 75 percent of OU-1A is covered with asphalt or concrete;

- OU-2: encompasses an area of approximately 2.2 acres (approximately 96,000 square feet). Soils with chemical concentrations above the RSCOs are present throughout OU-2. Currently, approximately 70 percent of OU-2 is covered with asphalt or concrete;

- OU-3 encompasses an area of approximately 1.3 acres (approximately 58,000 square feet). Practically all of OU-3 is covered with an asphalt surface. Capping is not required in OU-3;

- OU-4 occupies an area of 3.8 acres (approximately 166,000 square feet). The hill area in the middle of OU-4 consists primarily of soils and construction debris (e.g., concrete, asphalt, wood, and bricks). The contaminants of concern at OU-4 are PAHs and elevated arsenic concentrations detected in surface soil samples. Under this alternative, the construction debris would be removed, the hill area would be leveled, consolidated, and covered with one foot of uncontaminated material or capped with asphalt/concrete;

- OU-5 encompasses an area of 2.2 acres (approximately 96,000 square feet). Currently, approximately 15 percent of OU-5 is covered with asphalt or concrete.

Alternative 3 would include providing a cap over the entire area of OU-1A, OU-2, OU-4 and OU-5. Capping would not be necessary in OU-3 since the concentrations of contaminants in the soils are generally below the RSCOs and pose minimal risk. Depending on future use, OU-4 would either be capped or developed through warehouse type buildings.

The site-specific cap would consist of a combination of building structures with concrete floor slabs and paved asphalt areas. The concrete cap would consist of concrete floor slabs (minimum 6 inches thick). The actual thickness and construction of the concrete cap would be developed as part of the design for the new site buildings. The remainder of the site would be covered with an asphalt cap and be used for parking. The asphalt cap would consist of 6-inches of stone and a 4-inch thick asphalt layer. The asphalt would be constructed in accordance with road or parking area design specifications to support vehicular traffic. The asphalt would have, at a minimum, 5.5% bitumen and a maximum 2.5% air void ratio to minimize permeability. The overall site-specific cap design would be developed in conjunction with a future site redevelopment plan but, in any event, would be implemented no later than forty-eight months from issuance of the ROD. Detailed design would be presented in the design report. Maintenance and protection requirements for the cap would be specified to ensure that the long-term integrity of the cap is maintained for at least 30 years.

Once in place, the site-specific cap would isolate soils with chemical concentrations above the RSCOs from human receptors and the environment. It would also reduce infiltration of surface water through contaminated unsaturated soils and, thereby, reduce potential leaching of contaminants from the soils to the

groundwater. This would result in improved groundwater quality beneath the site depending upon upgradient chemical concentrations and tidal influences. Once a final redevelopment plan has been established for the site, construction of the site-specific cap and the Storm Water Management Plan would be integrated with the final site redevelopment. The storm water management system would include an on-site subsurface storm sewer system to aid in conveying surface water runoff from the site. All components of the storm water management system would be designed to comply with applicable State and municipal requirements.

Institutional controls including land use restrictions would be structured to ensure that areas of the site would only be developed with appropriate safeguards in place. Land use restrictions (deed restrictions) would be implemented to maintain the cap and would require a health and safety plan and a soil management plan in those instances where excavation for site development would potentially expose human receptors to impacted soil. Institutional controls would limit the use of groundwater as a potable or process water from the affected areas without the necessary water quality treatment as determined by the applicable agencies.

The property owner would complete and submit to the Department an annual certification until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective. Since hazardous soils would remain on site after remediation, the site would be reclassified from Class 2 to Class 4 once the remedy is in place. Class 4 signifies that the site is properly closed but requires continued management.

Long-term groundwater monitoring (30 years) would be implemented as described in Alternative 2.

The actual costs for the site-specific cap is difficult to estimate as it depends largely upon the final site redevelopment plan. The estimated capital costs to implement Alternative 3 exclusive of site redevelopment costs are approximately $4,840,000. The expected O&M costs would be approximately $211,500 per year, which includes an annual allowance for cap maintenance and groundwater monitoring.

Alternative 4: Physical Containment of Soils/ Institutional Controls And Hot Spot Removal/Disposal

Present Worth:	$ 10,374,000
Capital Cost:	$ 7,750,000
Annual O&M:	$ 211,500
Time to Implement	6 months - 1 year

Alternative 4 includes physical containment of soils with chemical concentrations above the RSCOs utilizing the same site-specific capping technology as described in Alternative 3 and additional "hot spot" removal with off-site disposal. Prior to construction of the site-specific cap, identified "hot spots" would be excavated and the material taken off site for disposal.

The site-specific cap would isolate soils with chemical concentrations above the RSCOs from human receptors and the environment and reduce the infiltration of surface water through the contaminated unsaturated soils. This would result in improved groundwater quality beneath the site depending upon upgradient chemical concentrations and tidal influences.

"Hot spot" remediation would involve removing approximately 6,100 cubic yards of PCB-contaminated surface soil/concrete within former Building 39 electrolytic tanks areas and petroleum-contaminated soil in the vicinity of former building 36. PCB-contaminated surface soil/concrete with concentrations above 10 ppm would be removed to minimize current and future risks to human receptors. The oily soils in the vicinity of former Building 36 would be removed to reduce the potential for groundwater contamination. The proposed extent of excavation in this area is based on visual observations of soil samples collected during June 2000. The soils would be excavated to the groundwater table (approximate depth of 4 to 5 feet). End point soil sampling would be performed following excavation to document chemical concentrations in the soils left on-site. Hot spot removal would minimize current and future risks to human receptors and reduce the potential for groundwater contamination. Excavated soils would be characterized and disposed off-site in accordance with applicable NYS and federal regulations. The excavations would be backfilled with clean imported fill in preparation for the site-specific capping system. The components of Alternative 4 are presented in Figure 4.

Consolidation and capping along with institutional controls (deed restrictions) would be implemented and an annual certification would be required as previously described for Alternative 3. "Hot spot" removal would take approximately 6 months. Installation of the site-specific cap and Storm Water Management plan would be integrated with the site redevelopment plan. Removal of the "hot spot" materials would be completed prior to the final site redevelopment in order to minimize current risks.

Long-term groundwater monitoring similar to Alternative 3 would be implemented to assess groundwater conditions and to monitor for potential changes to the groundwater quality.
The actual costs for the site-specific cap is difficult to estimate as it depends largely upon the final site redevelopment plan. The estimated capital costs to implement Alternative 4 exclusive of site redevelopment costs are approximately $7,750,000. The expected O&M costs would be approximately $211,500 per year, which includes an annual allowance for cap maintenance and groundwater monitoring.

Alternative 5: Physical Containment of Soils/Hot Spot Removal/Disposal/ Groundwater Containment/Extraction and treatment of Groundwater and Institutional Controls.

Present Worth:	$ 18,672,000
Capital Cost:	$ 12,052,000
Annual O&M:	$ 533,500
Time to Implement	6 months - 1 year

Alternative 5 would include physical containment of soils with chemical concentrations above the RSCOs utilizing the same site-specific capping technology as described in Alternative 3; additional "hot spot"

removal with off-site disposal as described in Alternative 4; and a groundwater containment and treatment system.

The groundwater containment system would include a series of groundwater extraction wells installed next to Newtown/Maspeth Creeks to intercept contaminated groundwater prior to its reaching the Creeks. The system is required to stop the discharge to the Creeks of the Phelps Dodge contaminant plume which contains heavy metals at several orders of magnitude above the allowable groundwater standards. The collected groundwater would be treated, as necessary, at an on-site treatment plant prior to discharge to the Creeks or another suitable location. A low permeability steel sheeting barrier wall would be installed next to Newtown/Maspeth Creeks, downgradient of the extraction wells, to reduce the inflow of surface water from the Creeks into the groundwater collection system. The sheet barrier is needed to prevent excessive migration of Creek waters into the groundwater extraction system which would render it less effective. With the sheet barrier in place, recovery of the contaminated plume would be optimized at low withdrawal rates. Pumping test results and geotechnical test work would be used to engineer the final design of the extraction and treatment system as well as the steel sheeting barrier wall that would be installed downgradient of the extraction wells.

The steel sheeting barrier wall would be approximately 2,500-foot long and extend to a depth of approximately 30 feet bgs. It would consist of interlocking steel sheet piles that would be treated with a corrosion-resistant sealant.

The collected groundwater would be treated for inorganics on-site to meet applicable criteria for discharge to surface water or a Publicly Owned Treatment Works (POT.).

The site- specific cap would isolate soils with chemical concentrations above the RSCOs from human receptors and the environment and reduce infiltration of surface water through contaminated unsaturated soils. This would result in improved groundwater quality beneath the site depending upon upgradient chemical concentrations and tidal influences.

"Hot spot" remediation would involve removing approximately 6,100 cubic yards of PCB-contaminated surface soil/concrete in the Former Electrolytic Tanks areas and petroleum contaminated soils in the vicinity of former Building 36. PCB-contaminated surface soil/concrete with concentrations above 10 ppm would be removed to minimize current and future risks to human receptors. Hot spot removal would minimize current and future risks to human receptors and reduce the potential for groundwater contamination. Excavated soils would be characterized and disposed of off-site in accordance with applicable NYS and Federal regulations. End point sampling to document the remaining soil contamination and/or to document the effectiveness of contaminated soil removal would be conducted after excavation and prior to backfilling. The excavations would be backfilled with clean imported fill in preparation for the site-specific capping system.

Consolidation and capping along with institutional controls (deed restrictions) would be implemented and an annual certification would be required as previously described for Alternative 3. Installation of the

groundwater containment system and "hot spot" removal would take approximately 6 to 8 months. Installation of the site-specific cap and implementation of the Storm Water Management Plan would be integrated with the site redevelopment plan.

Long-term (30 year) groundwater monitoring as described for Alternative 2 would be implemented to evaluate the effectiveness of the groundwater containment system and to monitor for potential changes to the groundwater quality.

The actual costs for the site-specific cap is difficult to estimate as it depends largely upon the final site redevelopment plan. The estimated capital costs to implement Alternative 5 exclusive of site redevelopment costs are approximately $12,050,000. The expected O&M costs would be approximately $533,500 per year, which includes an annual allowance for cap maintenance and groundwater monitoring.

The components of Alternative 5 are presented in Figure 5.

Alternative 6: Soil Removal/Off-Site Disposal /Groundwater Containment/ Groundwater Extraction and Treatment

Present Worth:	$ 109,000,000 - $ 233,517,700
Capital Cost:	$ 104,340,400 - $ 229,265,300
Annual O&M:	$ 396,300
Time to Implement	2 years - 3 years

Alternative 6 would involve removal of the majority of the soils with chemical concentrations exceeding RSCOs. This would involve excavation to depths ranging from 8 feet bgs in OU-3 to 22 feet bgs in OU-1A. Alternative 6 would also include installation of a groundwater containment and treatment system as described for Alternative 5 to prevent migration of contaminants in the groundwater to the Creeks.

The total volume of soils to be excavated would be approximately 536,000 cubic yards. Even with this level of soil excavation, it would not be possible to remove all contamination from the site and return it to redevelopment conditions. Therefore, some residual contamination would remain in the soils and groundwater.

Excavated soils would be characterized, pretested if necessary, and disposed of off-site in accordance with applicable NYS and Federal regulations. Disposal options would include the following:

- off-site Subtitle D landfill;
- off-site Subtitle C landfill; and
- off-site TCA landfill.

The excavations would be backfilled with clean imported soil.

Because it would not be possible to remove all contamination from the site in either the groundwater or the soils, a groundwater containment and treatment system as described in Alternative 5 would be installed. The groundwater containment system would include a series of groundwater extraction wells installed next to the Newtown/Maspeth Creeks to intercept contaminated groundwater prior to its reaching the surface water bodies. The collected groundwater would be treated, as necessary, at an on-site treatment plant prior to discharge to the Creeks or at another suitable location. A steel sheeting barrier wall would be installed next to the Creeks, downgradient of the extraction wells, to reduce the inflow of surface water from the Creeks into the groundwater collection system. Pumping test results and geotechnical test work would be used to design the extraction and treatment system and the details of the steel sheeting barrier wall which would be installed downgradient of the extraction wells.

Long-term groundwater monitoring would be implemented as described for Alternative 2 to evaluate the effectiveness of the groundwater containment system and to monitor for potential changes to the groundwater quality.

Institutional controls would be implemented and an annual certification would be required as previously described for Alternative 3. Land use restrictions (deed restrictions) would be implemented and would require a health and safety plan and a soil management plan in those instances where excavation for site development would potentially expose human receptors to impacted soil below groundwater.

The estimated capital costs for Alternative 6 are largely dependent upon the classification of the soils for off-site disposal and the ability to segregate hazardous soils from non-hazardous soils prior to transporting the material off-site. Depending upon percentage of the soil that would have to be disposed as a hazardous and/or Toxic Substance Control Act (TCA) regulated waste, the estimated capital costs for Alternative 6 range from $104,340,400 to $229,265,300. The expected O&M costs would be approximately $396,300 per year for cap maintenance and groundwater monitoring.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulations that govern the remediation of Inactive Hazardous Waste Disposal Sites in New York State 6 NYCRR Part 375. For each criterion, a brief description is provided, followed by an evaluation of the alternatives in light of it. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Alternative 1 would not comply with SCGs as exceedances of SCGs in soil and groundwater would not

be addressed. Alternative 2 would partially satisfy soil SCGs with institutional controls. For Alternatives 2, 3 and 4, chemical concentrations in groundwater would continue to exceed SCGs. For Alternative 3, 4 and 5, all of the site except OU-3 would be covered with a site-specific cap to address residual subsurface soil contaminants. Alternative 4 and 5 would remove PCBs in order to meet SCG for PCBs. Alternative 6 would satisfy SCGs for areas where fill materials are removed. Some soils below the excavation limits would continue to exceed SCGs.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternative 1 would not be protective of human health as soils with concentrations above the RSCOs would remain at the site and be potentially accessible to contact by workers or trespassers.

Alternative 2 would reduce potential exposure to contaminated soil by implementing institutional controls. For Alternatives 3, 4 and 5, reduced exposure would be accomplished by placing a site-specific cap over areas of the site with chemical concentrations in the soils above the RSCOs. Alternatives 4 and 5 would provide additional protection to human health and the environment by removal of PCB-contaminated soils that pose the highest potential risk at the site and removal of petroleum contaminated soils in OU-1A near former Building 36 that pose a potential risk to the groundwater.

Alternative 5 and 6 would prevent groundwater beneath the site with chemical concentrations above the Class GA groundwater standards from entering the adjacent Creeks by installing a groundwater containment and treatment system.

Alternative 6 would also protect human health and the environment by removal of the majority of the contaminated soil at the site.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives 1 and 2 would not result in any additional short-term adverse impacts as these alternatives do not involve any additional on-site work at the site.

Alternatives 3, 4, 5 and 6 would all involve some construction activities and disturbance of contaminated soils.

Alternative 4 would provide additional short term effectiveness over Alternative 3 as the PCB-contaminated soil which presents the greatest potential health exposure at the site would be removed. Alternative 5 would provide additional short term effectiveness over Alternative 4 by preventing groundwater with chemical concentrations above the Class GA groundwater standards from entering Newtown/Maspeth Creeks. Alternative 6 would have a much greater impact on the community and the environment due to the very large quantity of contaminated soil that would be removed and transported from the site and the longer duration required for implementation. Alternative 6 would require approximately 2 years to implement compared to 6 months to 1 year for Alternatives 3, 4 and 5.

A site-specific health and safety plan would be used to control worker exposure to contaminated soil and groundwater during implementation of any of the remedial alternatives. A community health and safety plan would be in place to minimize community exposure during construction.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would not reduce the long-term risks beyond what would be achieved by natural attenuation. Alternative 2 would reduce some risks by implementation of institutional controls. Alternatives 3, 4 and 5 would require maintenance of the capped areas to ensure long-term effectiveness. Alternatives 4, 5 and 6 would be effective for permanently removing some of the contaminant mass from the site. Alternatives 4 and 5 would result in removing the materials that present the greatest risk to human health and the environment (i.e. PCB and- petroleum contaminated soil hot spot areas) whereas Alternative 6 would result in removing a much larger volume of contaminated soil and provide a more permanent remedy. Institutional controls would be required for all alternatives, including Alternative 6, to provide long-term protection to human health and the environment from residual contamination.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1 and 2 would not reduce the toxicity, mobility or volume of chemicals at the site. Alternative 3 would reduce the mobility of the contaminants in the soil by capping. Alternatives 4 and 5 would result in both a reduction in volume by removing PCB and petroleum contaminated soil and a reduction in mobility by capping the remaining soil. Alternative 5 would also result in a reduction in volume of the chemicals at the site through extraction and treatment of contaminated groundwater. Alternative 6 would result in the largest reduction in waste volume; however, it would not result in complete removal.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary

personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternatives 1, 2, 3, 4 and 5 could be readily implemented. Alternative 6 would be very difficult to implement due to (1) the large volume of materials that would be moved both into and out of the site; (2) the need for extensive shoring and dewatering next to Newtown/Maspeth Creeks and treatment of the water; and (3) the need for extensive health and safety and environmental controls.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2. Present worth costs include capital costs and estimated operation and maintenance costs based on a 7% discount rate over a 30- year period.

On a present worth basis, Alternative 1 (No Further Action) would be the least expensive and Alternative 6 (Soil Removal and off-site Disposal/Groundwater Containment) would be the most expensive.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - This final criterion is considered a modifying criterion and is taken into account after evaluating those above. Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.[0]

In general the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to the implementation of Alternative 6 (complete removal of contaminated soils up to 24 feet deep); future remediation of sediments and surface waters of Maspeth/Newtown creeks; whether the responsible party will pay for the cleanup; and measures taken during remedy implementation to protect the public. These comments and associated discussions are included in Appendix A.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 5 as the remedy for this site. Alternative 5 includes physical containment of soils with the site-specific cap; "hot spot" removal of PCB and petroleum-contaminated soil (approximately 6,100 cubic yards) with off-site disposal, groundwater containment and treatment consisting of groundwater extraction wells; an on-site treatment system and a steel sheeting barrier wall adjacent to Newtown/Maspeth Creeks (Pumping test results and geotechnical test work will be used to design the extraction and treatment system and the details of the steel sheeting barrier wall which will be installed downgradient of the extraction wells);

institutional controls and a long term cap inspection/maintenance program and groundwater monitoring program.

The estimated present worth cost to implement the Remedy is $18,672,000. The cost to construct the Remedy is estimated to be $12,052,000 and the estimated average annual operation and maintenance cost for 30 years is $533,500.

The elements of the Selected Remedy are as follows:

- Undertake a remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved.

- Excavation of PCB-contaminated soil (i.e. PCB concentrations above 10 ppm) and petroleum-contaminated soil from OU-1A for off-site disposal.

- Consolidation of materials and grading in OU-4 to remove/level the existing hill.

- Construction of a site- specific cap as part of redevelopment of the site, consisting of asphalt pavement and building foundations on OU-1A, OU-2, OU-4 and OU-5. The cap will be installed no later than forty-eight months after the NYSDEC issuance of the ROD. The concrete cap will consist of concrete floor slabs (minimum 6 inches thick). The remainder of the site will be used for parking and will be covered with an asphalt cap that will consist of 6-inches of stone and a 4-inch thick asphalt layer. The asphalt will be constructed in accordance with road or parking area design specifications to support vehicular traffic.

- Installation of a groundwater containment and treatment system consisting of a network of approximately 8 groundwater extraction wells, an on-site treatment system and a steel sheeting barrier wall adjacent to Newtown/Maspeth Creeks (Pumping test results and geotechnical test work will be used to design the extraction and treatment system and the details of the steel sheeting barrier wall which will be installed downgradient of the extraction wells). The system is required to stop the discharge of the Phelps Dodge contaminant plume which contains heavy metals at several orders of magnitude above the allowable groundwater standards. The sheet barrier is needed to prevent excessive migration of Creek waters into the groundwater extraction system which will render it less effective.

- Implementation of Storm Water Management Plan in conjunction with the property redevelopment. The storm water management system will include an on-site subsurface storm sewer system to aid in conveying surface water runoff from the site. All components of the storm water management system will be designed to comply with applicable State and municipal requirements

Implement institutional controls by placement of deed restrictions to maintain the cap and require a health and safety plan and a soil management plan for site development. Institutional controls will limit the use of groundwater as a potable or process water from the affected areas without the necessary water quality treatment as determined by the applicable agencies. Annual certification will be required to confirm that the cap is maintained and institutional controls and engineering controls are in place.

Undertaking of long-term (30-year) groundwater monitoring to evaluate the effectiveness of the groundwater containment system.

After implementation of the selected remedy and approval of Operation Management and Monitoring Plan, the site will be reclassified from Class 2 to Class 4.

Since the remedy results in untreated hazardous waste remaining at the site, a long term (30 years) monitoring program will be instituted. Groundwater will be monitored on a quarterly basis for the first five years. Thereafter, the monitoring frequency could be reduced (e.g. semi-annual or annual basis) depending upon improvements in the groundwater quality. An annual groundwater report will be prepared for review. This program will allow the effectiveness of the remedy to be monitored and will be a component of the Operation, Maintenance and Monitoring plan for the site.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

A repository for documents pertaining to the site was established.

A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.

The first public meeting on the PRAP was held on August 28, 2002 in the Queens Borough President's Office.

The comment period on the PRAP was extended to November 25, 2002. Fact sheets informing the public regarding extension of the comment period and availability of the second public meeting were prepared and mailed to the revised mailing list and news media on October 8, 2002.

A notice was issued in the Environmental Notice Bulletin (ENB) on October 16, 2002.

The second public meeting on PRAP was held at Sunnyside Community Service Center on November 14, 2002.

In January 2003, a Responsiveness Summary was prepared and made available to the public, as part of this ROD, to address the comments received during the public comment period for the PRAP.

Table 1a
Nature and Extent of Contamination in Groundwater

CATEGORY	CONTAMINANT OF CONCERN*	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCGs	SCG/ Background (ppb)
Dissolved Metals	Antimony	ND (1.7) - 320	6 of 39	3
	Arsenic	ND (2.0) - 938	16 of 39	25
	Cadmium	ND (0.3) - 101	9 of 39	5
	Copper	ND (1.0) - 54,200	9 of 39	200
	Iron	ND (3.6) - 109,000	27 of 39	300
	Lead	ND (1.0) - 847	5 of 39	25
	Magnesium	2,750 - 289,000	21 of 39	35,000
	Manganese	0.42 - 3,560	24 of 39	300
	Nickel	ND (1.2) - 61,900	16 of 39	100
	Selenium	2.3 - 1,150	13 of 39	10
	Thallium	ND (2.2) - 6.8	9 of 39	0.5
	Zinc	ND (3.5) - 28,500	11 of 39	2,000

1)Groundwater results include filtered and unfiltered samples. Note: even filtered samples (e.g. copper) showed concentrations that were orders of magnitude above the groundwater standards.
2)VOCs and SVOCs were found at low concentrations.

Table 1b
Nature and Extent of Contamination in Soils

CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppm)	FREQUENCY of EXCEEDING SCGs	SCG/ Background (ppm)
Metals	Arsenic	ND - 6,810	213/268	7.5 or SB
	Lead	1.7 - 52,400	129/268	400
	Copper	9.3 - 273,000	261/268	25
	Chromium	0.17 - 1,330	54/268	50
	Antimony	.087 - 1,470	144/268	SB
PCBs	Surface	ND(.035) - 1,100	76/108	1
	Subsurface	ND(.035) - 94	15/232	10
SVOCs	Benzo(a)anthracene	.04J - 49.8	54/196	0.224
	Benzo(b)fluoranthene	.041J - 74.3	26/195	1.1
	Benzo(a)pyrene	.045J - 36.2	75/195	.061
	Dibenzo(a,h)anthracene	.054J - 3.0	27/82	0.0143
	Indeno (1,2,3)pyrene	.049J - 13.0	5/195	3.2
	Phenanthrene	.064J - 116.4	1/195	50

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
Alternative 1 - **No Further Action**	$0	$61,600	$764,900
Alternative 2 - **Institutional Controls**	$57,500	$97,300	$1,265,000
Alternative 3 - **Physical Containment/ Institutional Controls**	$4,970,000	$211,500	$7,592,000
Alternative 4 - **Physical Containment/ Institutional Controls and Hot Spot Removal**	$7,750,000	$211,500	$10,374,000
Alternative 5 - **Physical Containment/ Institutional Controls Hot Spot Removal & Groundwater Containment**	$12,052,000	$533,500	$18,672,000
Alternative 6 - **Soil Removal/ Off-Site Disposal/ Groundwater Containment**	$104,340,400 - 229,265,300	$396,300	$109,000,000 - 233,517,700

SOURCE:

RAND McNALLY ROAD ATLAS

Figure 1

Site Location
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA014 MAY 02/2002

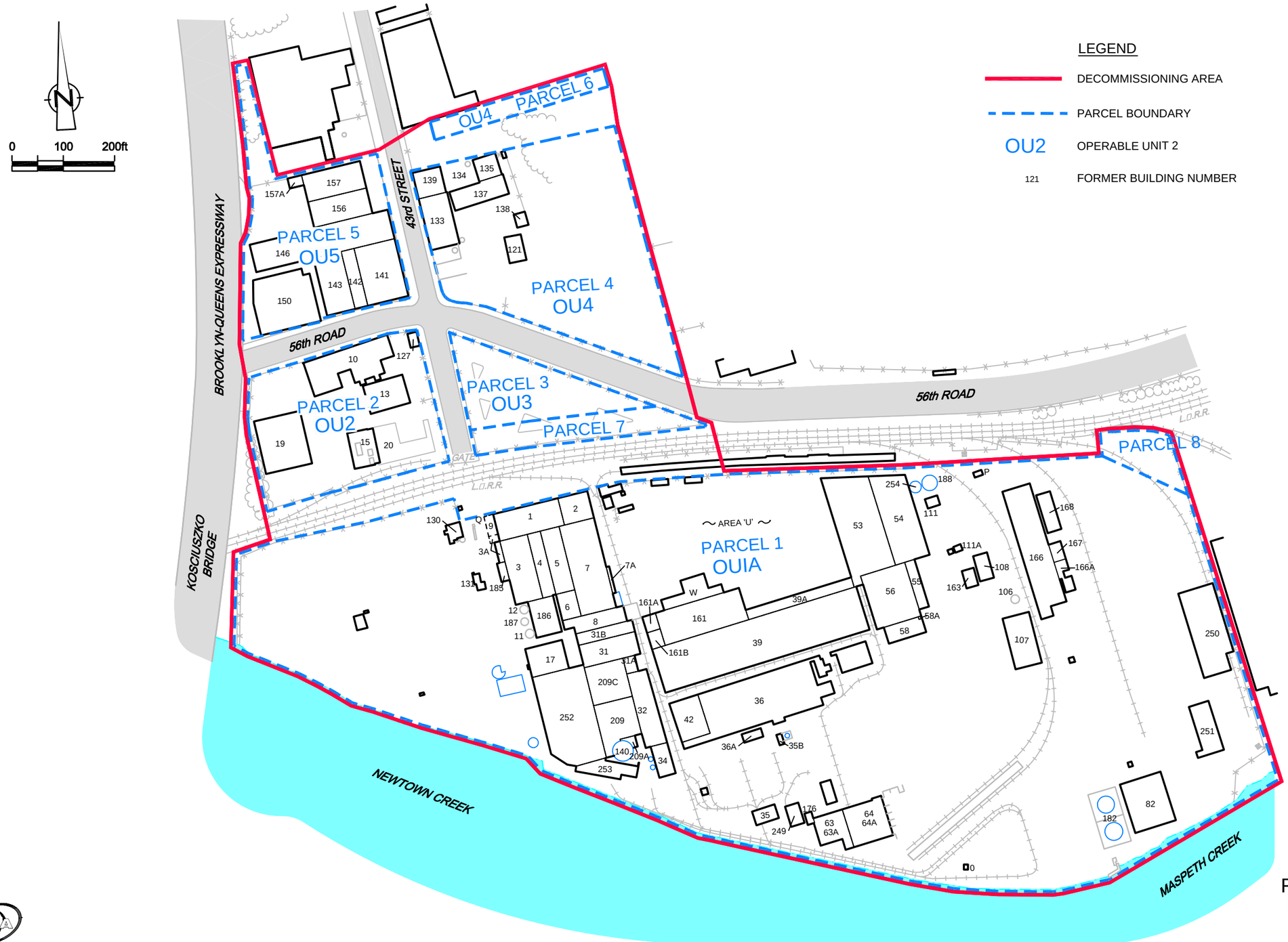
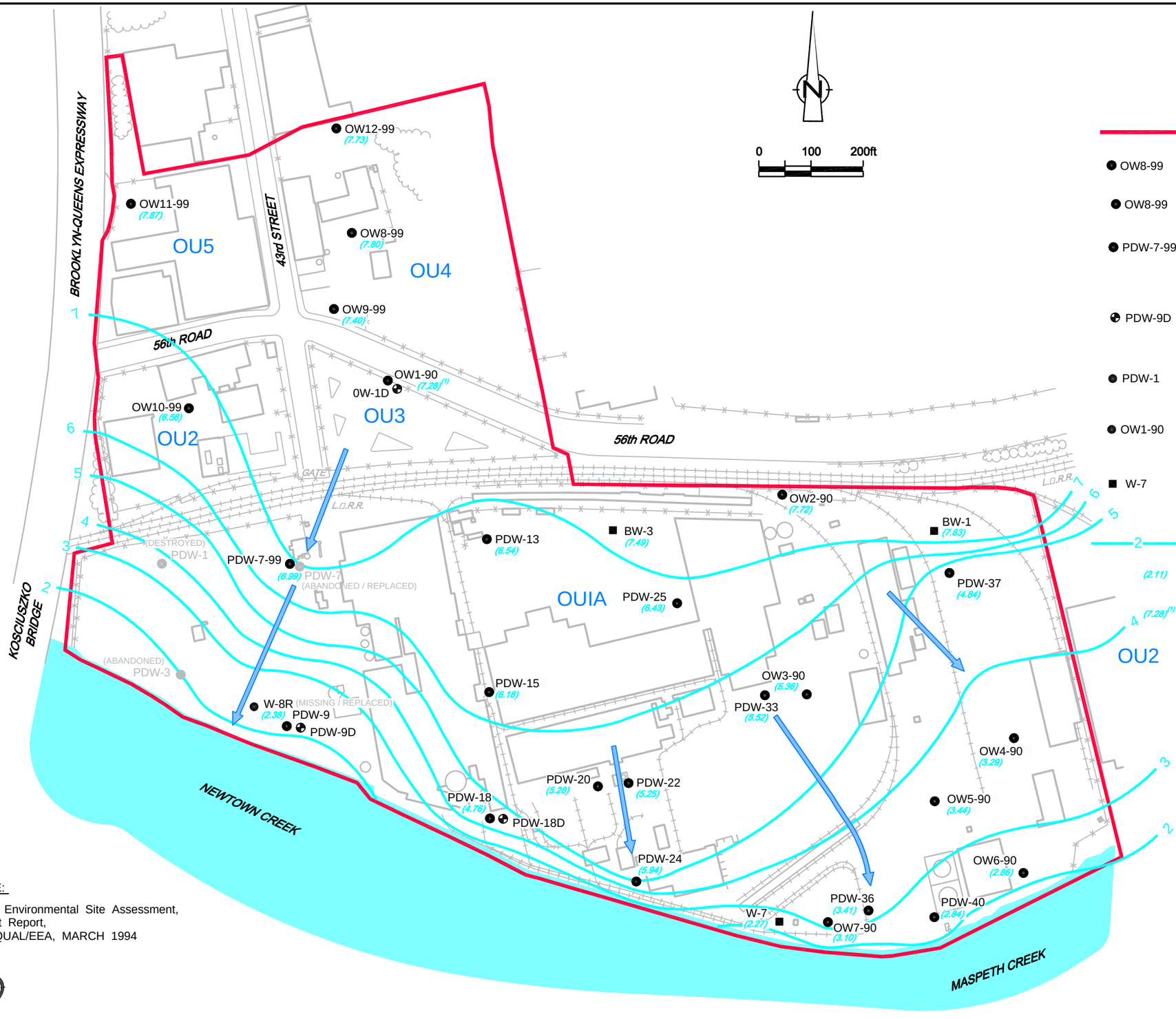


Figure 2 SITE PLAN
LAUREL HILL SITE
Maspeth, N.Y.

02939-50(PRES023)\GN-WA001 JUN 26/2002



LEGEND

- DECOMMISSIONING AREA
- OW8-99 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN JULY 1999 BY CRA
- OW8-99 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN JULY 1999 BY CRA
- PDW-7-99 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN JUNE 1999 BY CRA TO RELACE A MISSING WELL (W-8R) OR DAMAGED/ABANDONED WELL (PDW-7)
- PDW-9D — DEEP GROUNDWATER MONITORING WELL INSTALLED IN SPRING 1994 BY MALCOLM PIRNIE/HAZEN AND SAWYER
- PDW-1 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER/DECEMBER 1993 BY HYDROQUAL/EEA
- OW1-90 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN AUGUST/SEPTEMBER 1990 BY CRA
- W-7 — SHALLOW GROUNDWATER MONITORING WELL INSTALLED IN JANUARY 1985 BY SVERDRUP-GILBANE
- GROUNDWATER ELEVATION CONTOUR (ft. NAVD) MEASURED JULY 28, 1999
- (2.11) GROUNDWATER ELEVATION (ft. NAVD) (JULY 28, 1999)
- (7.28)(1) GROUNDWATER LEVEL MEASURED AUGUST 3, 1999
- OU2 OPERABLE UNIT 2

SOURCE:

Phase II Environmental Site Assessment,
inal Draft Report,
HYDROQUAL/EEA, MARCH 1994

Figure 3

GROUNDWATER CONTOURS
JULY 28, 1999
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA019 MAY 03/2002

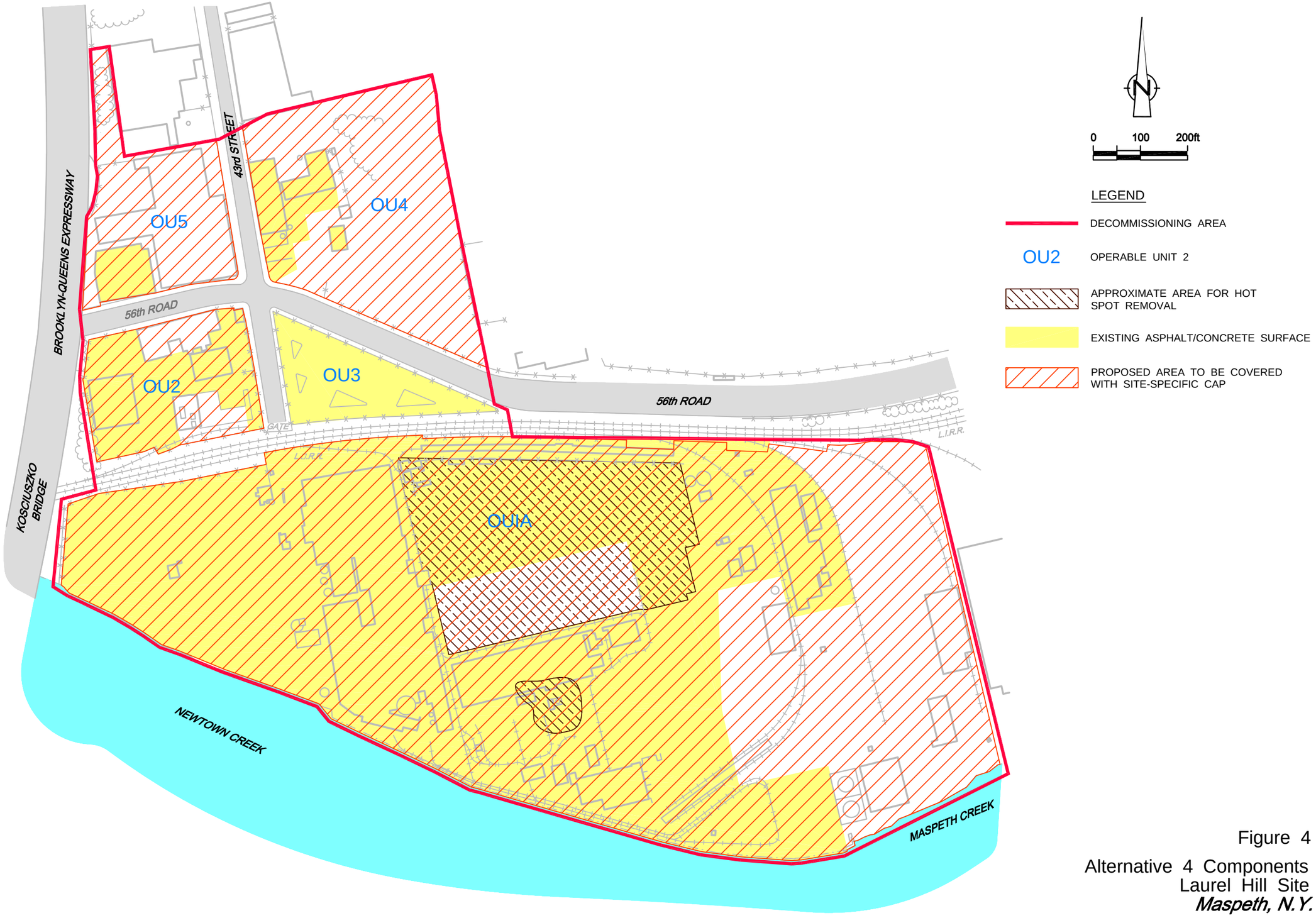


Figure 4

Alternative 4 Components
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA074 MAY 07/2002

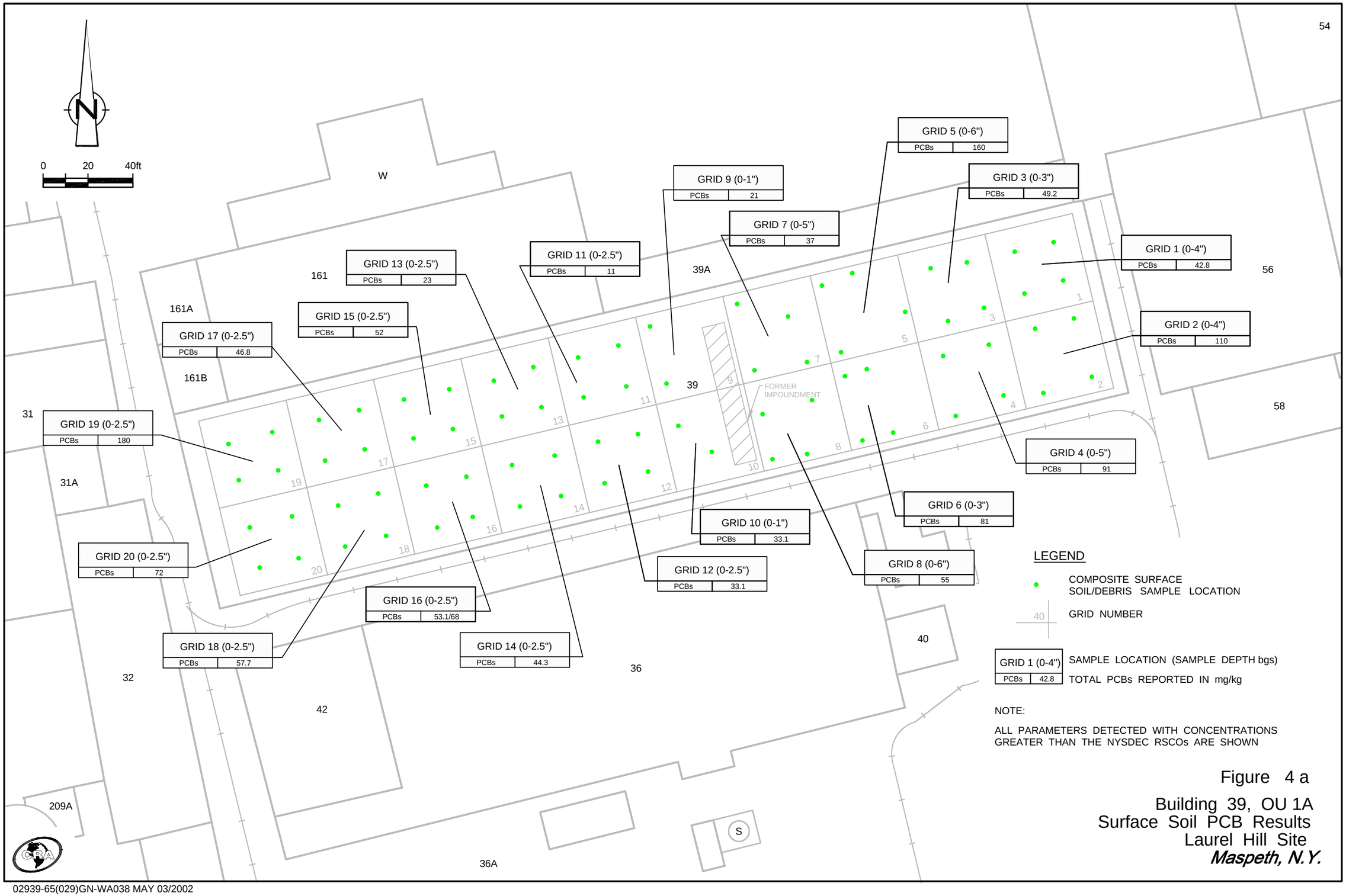


Figure 4 a

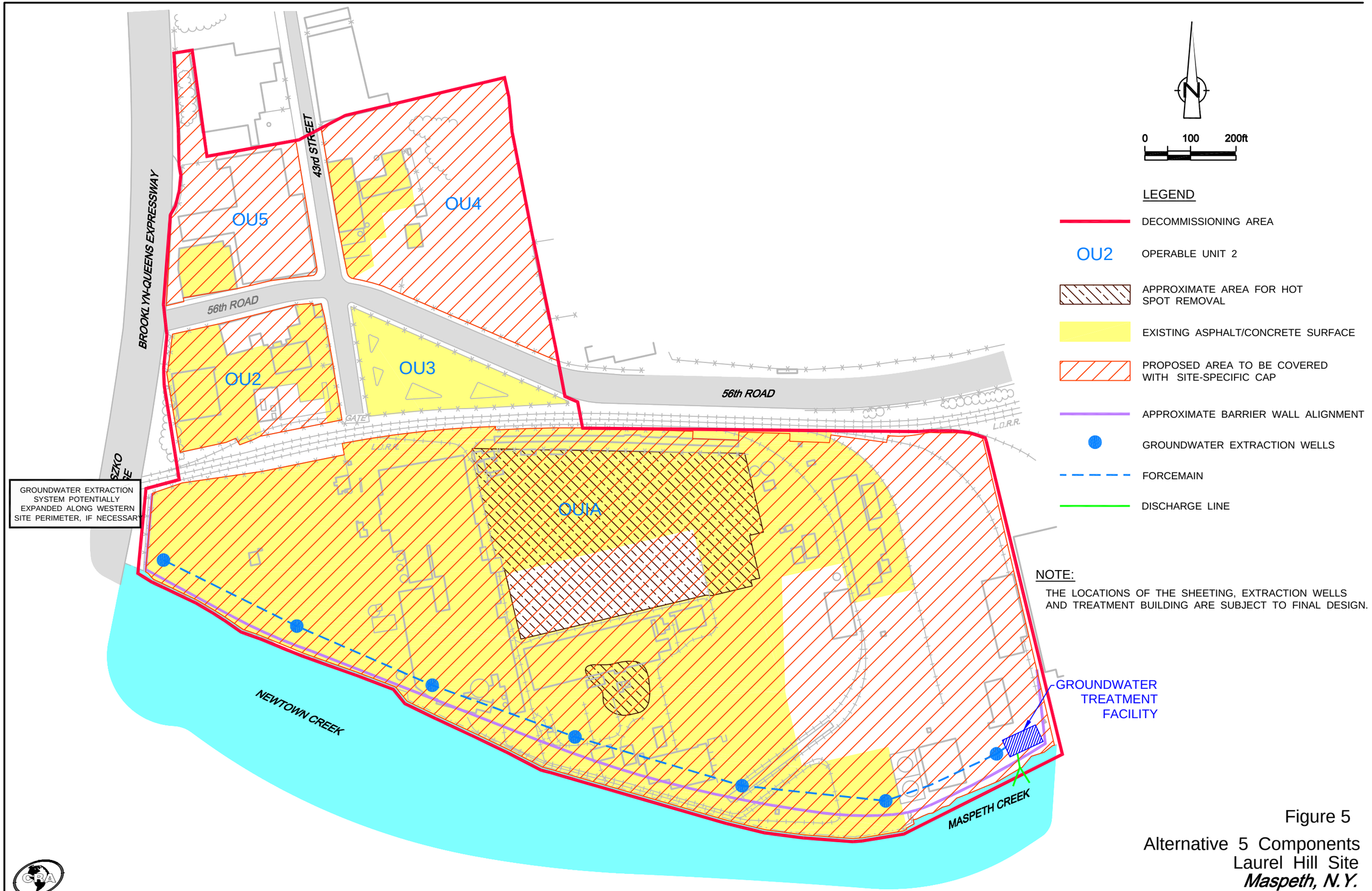
Building 39, OU 1A
Surface Soil PCB Results
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA038 MAY 03/2002

Figure 4 b

Extent Of Proposed Excavation
Of Oily Soils
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA070 MAY 03/2002



NOTE:

THE LOCATIONS OF THE SHEETING, EXTRACTION WELLS AND TREATMENT BUILDING ARE SUBJECT TO FINAL DESIGN.

Figure 5

Alternative 5 Components
Laurel Hill Site
Maspeth, N.Y.

02939-65(029)GN-WA076 MAY 09/2002

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Phelps Dodge (Laurel Hill) Site
Proposed Remedial Action Plan
Queens, New York
Site No. 241002

The Proposed Remedial Action Plan (PRAP) for Phelps Dodge was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on August 14, 2002. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil and groundwater at the Phelps Dodge (Laurel Hill) Site in Maspeth, Queens. The preferred remedy is: excavation and off-site disposal of "hot spots" of contaminated soil; capping of almost the entire site with concrete or asphalt; the implementation of a groundwater extraction, collection and treatment system (groundwater treatment system); soil management and storm water management plans; long-term groundwater monitoring; long-term cap maintenance, monitoring and certification; restrictions on land and groundwater usage; and a series of additional institutional controls.

The release of the PRAP was announced via two separate Notices, including a Fact Sheet for the Site, to the mailing list. The Notices informed the public of the PRAP's availability and of the two public meetings (described below).

The first public meeting was held on August 28, 2002 at the Queens Borough President's Office. At and subsequent to the meeting, the NYSDEC received comments about the asserted lack of sufficient notice for the meeting. In response to these comments, the NYSDEC initially extended the public comment period for the PRAP from September 14 to September 22, 2002, and provided appropriate notice of that extension. The NYSDEC thereafter determined to hold a second public meeting on November 14, 2002 at the Sunnyside Community Service center in Sunnyside, New York. Notice of this second meeting and the extension of the public comment period to November 25, 2002, together with a Fact Sheet summarizing the Site contamination and proposed remedy, was issued and mailed to the Site mailing list on October 8, 2002. A notice was also issued in the Environmental Notice Bulletin (ENB) on October 16, 2002.

Both public meetings included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) and a discussion of the proposed remedy. Both public meetings provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. This Responsiveness Summary responds to all questions and comments raised at both the August 28 and November 14, 2002 public meetings and to the written comments received through November 25, 2002.

After the first public meeting of August 28, 2002, written comments were received from:

Helen Marshall	President of The Borough of Queens
Gary Giordano	District Manager, Community Board #5
Francis J. Principe	Chairman, Community Board #5
Honorable Nydia M. Velazquez	Congresswoman, 12th District, New York
Honorable Catherine Nolan	Assemblywoman
Stephen & catherine Doran	Maspeth, Queens
Edward M. Aretz,	Seamans Reality & Management Co
Noel M. Fitzgerald	Maspeth, Queens

The second meeting was well attended by more that 70 residents and elected officials. Written comments were received as follows:

A letter dated November 14, 2002 was received from Council Member Eric Gioia and Council Member David Yassky which requested that remediation efforts at this location should address the contamination of both Newtown & Maspeth Creeks. It further states that by delaying action, the health of the Creeks will further deteriorate, and the cost of clean up will only increase.

A letter dated November 19, 2002 was received from Assembly member Margaret Markey which requested that a full environmental study be conducted throughout a mile radius of the Phelps Dodge site.

A letter dated November 19, 2002 was received from Mr. Edward Kampermann, which advocated that all the debris from this site be removed by way of the New York and Atlantic Railroad; he also suggested that all materials for the concrete cap be delivered from Ferrara Concrete which operates a plant only 1500 feet from the site.

A letter dated November 20, 2002 was received from William F. Alex which stated that Alternative 5 does not do as much as possible to cleanup the site. He also suggested that the projected costs of Alternative 6 could be considerably reduced if barge and rail transport were used for materials transport in lieu of trucks.

A letter was received from Helen Marzec which commented on health hazards to senior citizens and enquired about any class action claim against Phelps Dodge.

A letter dated November 20, 2002 was received from Carol A. Terrano, Community Board #2 member, which endorsed Alternative 5 as the most practical remedy and the safest one for all of the community.

A letter dated November 21, 2002 was received from Laura Hofmann of Friends of Newtown Barge Terminal Playground & Greenpoint Park which alleged that capping is an inadequate way of dealing with a highly contaminated waterfront property. She also requested that signs be posted along the Creeks warning the public of fishing & crabbing dangers.

A letter dated November 25, 2002 was received from Mr. Gary Giordano, Community Board #5, which stated that the best cleanup to ensure that contamination of both the land and the Creeks would likely be an alternative somewhere between Alternatives #5 and #6.

A letter received on November 25, 2002 from Mr. Frank H. Finkel of Davis & Warshow Inc. commented that they are in full support of Alternative 5.

A letter dated November 25, 2002 was received from President of the Borough of Queens which urged NYSDEC to proceed on this project since it is an industrial site with excellent redevelopment potential and requested that NYSDEC also continue with the initiatives to clean up both Maspeth and Newtown Creeks as soon as practicable.

A letter dated November 25, 2002 was received from Assemblywoman Catherine Nolan which requested that the site be properly monitored during implementation of Alternative 5 to insure that residents and workers are not exposed to toxic chemicals. Assemblywoman also requested that regular meetings be scheduled with Community Boards #2 & #5 to ensure community input.

A letter dated November 26, 2002 was received from Mr. Joseph Conley, chairperson, Community Board No. 2, which asked NYSDEC to move expeditiously on the PRAP's preferred remedy, Alternative 5.

Comments Relating to the Notice of Public Meeting and **Number, Location and Purpose**

Comment 1: **There was no newspaper article about the August 28 meeting, insufficient outreach and insufficient time for public comment. Thus, members of the community were not informed about the meeting.**

Response 1: A Notice of Public Meeting and a Fact Sheet for Phelps Dodge Site was mailed on August 15, 2002 to the following mailing list including the newspapers:

1) Newsday, 95-25 Queens Blvd., Rego Park, New York 11374
2) The Glendale Register, 65-17 Grand Avenue, Maspeth, New York 11378
3) The Ridgewood Times, 815 A Seneca Avenue, Ridgewood, N Y 11385
4) Congressman - Joseph Crowley, 46-12 Queens Blvd., Sunnyside, N Y 11104
5) City Council Member – Eric Gioia, 250 Broadway – 18th Floor, NY 10007
6) Senator Serphin Maltese, 71-04 Myrtle Avenue, Glendale, NY11385
7) Assembly person - Catherine T. Nolan, 879 Woodward Avenue, Ridgewood, New York 11385
8) Assemblyman - Anthony Seminerio, 114-19 Jamaica Avenue, Richmond Hill, New York 11418
9) Mr. Giordano, District Manager, Community Board 5, 61-23 Myrtle Avenue, Glendale, New York 11385

10) Honorable Helen Marshall, Queens Borough President, 120-55 Queens Blvd., Kew Gardens, New York 11424
11) Honorable James Gennarro, Chairman, NYC Council Committee for Environmental Protection, City Hall, 250 Broadway, New York, NY 10007
12) Honorable William Thompson, Comptroller - City of New York, Municipal Building, Room 530, New York, New York 10007
13) Ms. Annette Barbaccio, Office of the Mayor, 100 Gold Street, New York, New York 10007
14) Mr. John Wuthenov, New York City Department of Environmental Protection, 59-17 Junction Blvd., Corona, New York 11368
15) Mr. Frank Principe, President - West Maspeth Local Development Corporation 57-20 49th Street, New York, New York 11378
16) Mr. Joseph Conley, Chairman, Queens Community Board #2 43 - 22 50th Street, Woodside, New York 11377
17) Davis & Warshow, Inc., 57-22 49th Street, Maspeth, New York 11378
18) Awysco, 55-15 43rd Street, Maspeth, New York 11378
19) Alice Cheng, NYCEDC, 110 William Street, New York 10038
20) Ms. Dorothy R. Morehead, Chair, Queens Community Board #2 39 - 08 46th Street, Sunnyside, New York 11104
21) Mr. Anthony Nunziato, Chair, Queens Community Board #5

The following persons and entities were added to the mailing list since the public meeting of August 28, 2002 and, along with the persons and entities identified above, received the Notice of the November 14, 2002 public meeting, extension of public comment period to November 25, 2002, and Fact Sheet:

22) Congressman Joseph Crowley, 82-11 37th Ave, Jackson Heights 11372, Room 607 718/779-1400
23) Congresswoman Nydia M. Velasquez (12th Congressional District), 718/599-33658
24) Assemblywoman Margaret M. Markey(30th District), 84-32 Grand Avenue, Elmhurst NY 11373, 718/651-3185
25) Jen Macdonald, Columbia University, 116th Street, New York, NY100.

The following persons and entities were added to the mailing list since the public meeting of November 14, 2002:

26) Joseph Conley, Chairperson, Community Board # 2, 43-22 50th Street, Woodside, NY 11377
27) Laura Hofmann, Friends of Newtown Barge Terminal Playground & Greenpoint Park, 127 Dupont Street, NY 11222.
28) Carol A. Terrano, 60-07 50th Avenue, Woodside, NY 11377.

29) William F. Alex, 46-15 54th Road, Maspeth, NY 11378.
30) Frank H. Finkel, Davis & Warshow Inc., 57-22 49th Street, Maspeth, NY 11378.
31) Deborah Masters, Community Board #1, 475 Kent Avenue, Brooklyn, NY 11211
32) Steven W. Bennett, PARSONS, 100 Broadway, NY, NY 10005.
33) John Maier, New York University, 1 East 78th Street, New York, NY 10021.
34) Robert Adams, NYSDOT, 47-40 21st street, Long Island City, NY 11101.
35) Joel Torres, 73-19 72nd Street, Glendale, NY 11335.
36) Nick Diamantis, Clinton Diner, 56-26 Maspeth Avenue, NY 11378

To reiterate, both public meetings included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) and a discussion of the proposed remedy. Both public meetings provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. This Responsiveness Summary responds to all questions and comments raised at both the August 28 and November 14, 2002 public meetings and to the written comments received through November 25, 2002. Comments that were similar or raised comparable concerns have been consolidated and summarized and synthesized. The following are the comments received at the public meetings and in writing, with the NYSDEC's Responses, which are grouped together by general categories. These comments have become part of the Administrative Record for this site.

Comment 2:

Today (November 14th.) you are conducting this public meeting and the comment period ends on November 25th. Could the comment period be further extended (past November 25th.) And could copies of PRAP be placed in the Greenpoint Public Library?

Response 2:

NYSDEC does not believe that additional time to comment is necessary, as the initial Notice and Fact Sheet were mailed in mid-August, and the PRAP was placed in the Queens Borough Public Library, Sunnyside Branch in mid-August as well. In addition, the first public meeting was held on August 28th, and there was extensive media coverage about that meeting. The second Notice and Fact Sheet were mailed on October 8, 2002. Overall, therefore, there has been over three months since the first Notice was mailed, which should be more than sufficient time to allow for public comment. A copy of the Fact Sheet and PRAP has been placed in the Greenpoint Branch Library as well as at the Queens Borough Public Library, Sunnyside Branch and with Community Boards 1, 2 and 5.

Comment 3:

Why are you having this meeting?

Response 3:

Under the citizen participation requirements of the New York State Inactive Hazardous Waste Disposal Site Remedial Program (also called the State Superfund Program) outlined in 6NYCRR Part (375-1.5(c)(2)), we are required to have a public meeting when the Remedial Investigation/Feasibility Study is completed and the remediation is proposed. We are further required to summarize the comments received at the public meeting and make that summary available to the public, which we are doing in the form of this Responsiveness Summary in this Record of Decision (ROD).

Comment 4:

Is this (August 28th) meeting just to present the Alternatives?

Will there be an additional meeting? We would like to have another public hearing in our Community Board (No. 5).

Response 4:

Per the community's request, the NYSDEC held a second public meeting on November 14, 2002 at the Sunnyside Community Service Center, 43-31 39th Street, Sunnyside, New York, which is a location convenient to residents of Community Board 5, as well as Community Board 2 (in which the Site is located).

Although both public meetings included a presentation of the Alternatives, this was not the sole purpose of the meetings. Each meeting also included a discussion of the investigation results and the proposed remedy (Alternative 5), an explanation of the basis for its identification as the proposed remedy, answers to any questions and acceptance of comments from the public on relevant aspects on the PRAP, and other relevant aspects of the process.

Comment 5:

Will the PRAP be on the NYSDEC website?

Response 5:

The PRAP is not available on the NYSDEC website at this time, however, the Department is planning to include all PRAPs and RODs on the website in the future.

Comments relating to the Remedial Investigation

Comment 6:

What are the wells on the Site; are they production wells? Are they dry wells?

Response 6:

The wells on the Site are groundwater monitoring wells and are used for the collection of groundwater samples. These wells are 4" diameter and are 10 to 22 foot deep. Some of these wells may be used for the monitoring of groundwater quality that is part of the selected remedy. There are no dry wells on the Phelps Dodge site.

Comment 7:

Were the PCBs on the Site analyzed by a congener-specific analysis? If the PCBs were analyzed by arochlors, which were predominant?

Response 7:

PCBs were analyzed by arochlors. Arochlors 1254 and 1260 were the predominant arochlors found on the Site

Comments relating to Evaluation of Alternatives

Comment 8:

If Alternative 2 were selected, which provides only for institutional controls, would that mean that the Site would be unused?

Response 8:

No, implementation of institutional controls would not prevent development of this Site.

Comment 9:

What are differences between Alternative 5 and Alternative 6? What are the specific reasons that Alternative 6 was found to be infeasible or unacceptable?

Alternative 5 would mean higher risks for the community. Phelps Dodge has been responsible for the pollution on the Site and the Creek, and the community has been subject to pollution from Phelps Dodge's operations for over 50 years; thus, why shouldn't Phelps Dodge be required to implement Alternative 6?

Why does NYSDEC believe that Alternative 5 is more protective of public health and the environment than Alternative 6?

Response 9:

Alternatives 5 and 6 would both be protective of human health and the environment at the Site for the long-term. Each would provide for placement of a Site-specific cap on operable units OU-1A, 2, 4 and 5 (for Alternative 5 the cap would be concrete/asphalt; for Alternative 6, the cap is clean backfill); installation of a groundwater containment system consisting of steel sheeting barrier wall adjacent to Newtown/Maspeth Creeks to intercept contaminated groundwater before it enters the Creeks; on-Site extraction and treatment of groundwater; capping of the Site and long-term

maintenance and monitoring of the cap; long-term groundwater monitoring; and the implementation of institutional controls.

The principal difference between the two alternatives is the extent of excavation and disposal of contaminated soil. Alternative 5 would result in removing the materials that present the greatest risk to human health and the environment (i.e., PCB and petroleum-contaminated soil hot spot areas), whereas Alternative 6 would result in removing a much larger volume of contaminated soil. In particular, Alternative 5 provides for the excavation of approximately 6,100 cubic yards of PCB and petroleum-contaminated soil in OU-1A to a depth of four to five feet, whereas Alternative 6 entails the excavation of much larger quantities of contaminated soil – approximately 536,000 cubic yards to depths of up to 22 feet. However, even with the excavation of greater amounts of soil, not all of the contaminated soil can feasibly be removed. The Site soils are contaminated both above and below the groundwater, and it is infeasible and, as a practical matter, impossible to remove all contaminated soil below the groundwater table. Consequently, even with the greater removal of contaminated soils, there would be residual contamination in the soils and groundwater and the Site would still need to be capped with clean backfill and the groundwater would still need to be contained and treated. Thus, Alternative 6 would not result in a complete removal of contaminated soils and would not provide a more permanent remedy.

Alternative 6, however, would generate significant short-term adverse environmental and public health impacts that would not arise from implementation of Alternative 5. These adverse impacts would accrue from the very large quantity of contaminated soil that would be removed and transported from the Site and the longer duration required for implementation. Implementation of Alternative 6 would require two to three years, compared to six months to a year for Alternative 5. The soil excavation and removal of Alternative 6 would be the reason for the two to three-year time frame; in contrast, the soil excavation and removal in Alternative 5 would take only about a month. Alternative 6 would generate far more dust and over a much longer period of time than Alternative 5.

Alternative 6 would generate an estimated 36,000 truck trips, as opposed to approximately 400 truck trips for Alternative 5. Most of the 400 truck trips associated with Alternative 5 would occur over the approximately one-month period in which hot spot removal is expected to occur.

Alternative 5 could be readily implemented, as the excavation above the water table for the hot spot removal presents no significant technical issues. Alternative 6 would be very difficult to implement due to (1) the large volume of materials that would be moved both into and out of the Site; (2) the need for extensive shoring and dewatering next to Newtown/Maspeth Creeks and treatment of the water; and (3) the need for extensive health and safety and environmental controls.

On a present worth basis, Alternative 5 would be less expensive ($18,672,000) than Alternative 6 ($109,000,000 to $233,517,700).

Based on this comparison, Alternative 5 is considered to be more protective than Alternative 6 in terms of short term protection, and they are comparable for the long term protection.

Alternative 5	**Alternative 6**
6 Months to implement.	24 months to implement.
Excavation and removal of hot spots (4 to 5 foot depths)	Excavation and removal up to 22 foot depths.
Minimal short term effects to community	100 times increased short term negative impacts to groundwater, surface waters and community air quality.
Contaminated Soils: 6,100 cubic yards	Contaminated Soils: 536,100 cubic yards.
Truck trips in Maspeth: 400	35,800 truck trips in Maspeth.
Capping with concrete & asphalt	Backfilling with clean fill.
Costs: $18.7 million	Costs: $109 to $234 million.
Groundwater containment, extraction and treatment system for both alternatives.	
Long term monitoring and maintenance for both alternatives	
Long term (30 years) groundwater monitoring for both alternatives.	
Deed restrictions to industrial/commercial usage to both alternatives.	

Comment 10:

What has been NYSDEC's relationship with the current landowner, Phelps Dodge, with regard to Alternative 5? Are they amenable to Alternative 6? Would they legally challenge it?

Response 10:

The NYSDEC and NYSDOH have been working with Phelps Dodge on the remediation of the Site. Over the years, Phelps Dodge has signed three Consent Orders to conduct various IRMs, on-site and off-site investigations. Once the ROD is issued, Phelps Dodge will notify the Department within 30 days whether it will implement the remedy under the recently executed consent order dated 6/18/2002.

Given the comparison between Alternatives 5 and 6, it would be unreasonable to impose the more expensive and less feasible Alternative 6 simply because Phelps Dodge polluted the environment. The purpose of the New York State Superfund program includes the requirement for the responsible party to pay for remediation of the Site. Since Alternative 5 meets the legal requirements for cleanup enunciated in 6 NYCRR Part 375 (particularly, 375-1.10–Remedy Selection), Alternative 5 is the Department's preferred remedy for the Site.

Comment 11:

Who is paying for remediation?

Response 11:

Phelps Dodge has prepared the RI/FS reports and presented the various cleanup alternatives. In accordance with June 2002 consent order, after the ROD is issued, Phelps Dodge will submit a Work Plan for Remedial Design/Remedial Action (RD/RA) to implement the selected remedy which includes hot spot removal of PCB and -petroleum contaminated soil in OU-1A; placement of a Site-specific cap consisting of asphalt or concrete on operable units OU-1A, 2, 4 and 5; installation of a groundwater containment system consisting of steel sheeting barrier wall adjacent to Newtown/Maspeth Creeks to intercept contaminated groundwater before it enters the Creeks; and an on-Site groundwater extraction and treatment system.

Phelps Dodge has paid for all investigations and IRMs to-date and will pay for all future remediation.

Comment 12:

Use of barge and rail transport could considerably reduce the cost of Alternative 6.

Response 12:

Alternative 6 would generate an estimated 36,000 truck trips, as opposed to approximately 400 truck trips for Alternative 5. Although it has been suggested that the cost of Alternative 6 could be considerably reduced by the use of rail or barge transport, no specific information was provided. Both rail and barge transport would require additional soil handling and would also necessitate trucking to transport material to and/or from the barge or rail line, which would add costs and likely negate any potential savings in the transportation costs over trucking. Further, transportation is only part of the large costs associated with off-Site disposal. The costs for disposal of soil would still be incurred, regardless of the transportation method used. Thus, the savings would not be significant and would not affect the very large differential between these alternatives.

In addition, both rail and barge transport require additional steps in the handling of contaminated soils. For barging, the soil has to be trucked to the barge, and then unloaded off the barge onto a truck to reach the ultimate destination. For rail, the Montauk Branch of the Long Island Rail

Road (LIRR) is used only by diesel-powered locomotives. It is the only rail line of the Montauk Branch to or from Manhattan. Soil from the Site would first be loaded onto trucks and then loaded onto rail cars because there is no rail spur on the Site. For rail, this concept would plainly be infeasible, as it would require a diesel-powered locomotive to spend extensive periods of time stopped (though running) on the only rail line of the Montauk Branch to and from Manhattan. Furthermore, unless the material was disposed of at a site with rail access, the soil would also need to be unloaded onto trucks for transport to the ultimate disposal location.

On a present worth basis, Alternative 5 would be less expensive ($18,672,000) than Alternative 6 ($109,000,000 to $233,517,700). More importantly, however, the increased cost of Alternative 6 was not a sole reason for its rejection. Rather, as explained above, Alternative 6 would have considerably greater short-term adverse environmental and health impacts to the community than Alternative 5 while not achieving materially greater long-term environmental or health benefits.

Comment 13:

Who developed Alternatives 5 and 6?

Response 13:

Phelps Dodge has prepared the remedial investigation report and evaluated various remedial alternatives. A detailed evaluation of all alternatives is presented in section 7.2 of the PRAP. All Alternatives were evaluated consistent with the criteria defined in the regulations that govern the remediation of Inactive Hazardous Waste Disposal Sites in New York State, 6 NYCRR Part 375. Under these requirements, the responsible party (Phelps Dodge Refining Corporation) is required to identify and discuss in the Feasibility Study, a range of alternatives that could address the contamination. These alternatives must include the No Action Alternative, which is Alternative 1, as well as the maximum remediation, which is Alternative 6. Although these alternatives were initially identified by Phelps Dodge, they were reviewed in detail by the NYSDEC & NYSDOH, and Phelps Dodge was required to expand and amplify on the contents of many of the identified alternatives, including proposed Alternative 5. Additionally, see response to comment No. 12 above.

Comment 14:

Isn't there a viable remedy between Alternatives 5 and 6 – an Alternative 5 ½? Can the NYSDEC assure that Alternative 5 protects the public? Why did the Feasibility Study preparedby Phelps Dodge have an Alternative 6 if Alternative 5 would protect the public?

Response 14:

As discussed earlier, the principal difference between Alternatives 5 and 6 is the extent of excavation of soil from the Site. Alternative 5 entails the removal of approximately 6,100 cubic yards of PCB and petroleum-contaminated hot spot soils that pose the greatest potential risks at the Site, while Alternative 6 would involve the excavation of approximately 536,000 cubic yards

of contaminated soil. Each of the alternatives involves the placement of a cap (concrete/asphalt for Alternative 5; backfilled material for Alternative 6) over the Site (except for OU-3) to eliminate potential exposure to contaminated soil. And each involves a groundwater containment, extraction and treatment system, which prevents contaminated groundwater from entering Newtown and Maspeth Creeks. Accordingly, an Alternative 5½ would not provide any greater protection to the public health or the environment than Alternative 5.

There is no viable remedy between Alternative 5 and 6. Any such remedy would necessarily entail the excavation of significant additional contaminated soil from the Site in order to be differentiated from Alternative 5. The negative effects to the public health and environment of increased soil remediation would be the same type as those associated with Alternative 6, such as increased truck trips, increased potential for fugitive dust, likely extensive shoring and dewatering near Newtown Creek, and treatment of groundwater during excavation – all of which would occur over a longer period of time than the remedy in Alternative 5. Although the exact extent of such additional adverse impacts cannot be ascertained, because the comments did not identify an alternative between 5 and 6, such an alternative would not be more protective of public health and the environment in the long-term than Alternative 5, and would be less protective during the years of remediation. Therefore, it is not preferable to Alternative 5.

Comments Relating to the Proposed Remedy

Comment 15:

What is the exact cap of the Site that is part of the remedy? What protection is there if a future owner needs to dig a foundation and penetrate the new cap? Who will pay for the installation and maintenance of the cap if Phelps Dodge is not around to pay?

Response 15:

The Feasibility Study considered a variety of options for capping, including concrete, asphalt, clay and an artificial liner (such as used in new landfills). Because the Site is a candidate for redevelopment after remediation, any cap chosen should be able to withstand usage and be reasonably susceptible to regular maintenance and repair. The cap that is part of the remedy is separate and distinct from the concrete and asphalt that now covers about 70% of the Site; it is a new cap that must be designed to detailed specifications.

The asphalt or concrete cap is more compatible with redevelopment. The Feasibility Study also considered a composite cap, consisting of one or two layers of clay and/or synthetic membrane. This option was rejected because it would be very difficult, if not impossible, to redevelop the Site without compromising this liner and to integrate the liner into a future Site development plan. Thus, either a minimum of six inches of concrete or four inches of road-grade asphalt over six inches of stone were selected for the cap. The concrete was selected because it is used to construct foundations or floors for buildings that would be part of any redevelopment. The asphalt is the

common constituent of a parking lot. This cap will eliminate dermal contact with the contaminated soil and minimize infiltration of precipitation or runoff into the soils.

Maintenance of the cap, and the requirement for annual certification by a licensed Professional Engineer, will be contained in deed restrictions that run with the land and bind future owners. Any future disturbance of the cap (e.g., for a new building foundation) would require suitable restoration to maintain the integrity of the cap.

Comment 16:

Why was the cheapest method of capping – concrete – chosen?

Response 16:

Capping with concrete is an accepted remedy for addressing the metal contamination at the Site (which would be the primary contaminant remaining after hot spot removal); it is used throughout the country under the federal Superfund program and under state counterparts, including New York State.

Comment 17:

Isn't the capping the same remedy that was proposed as far as ten years ago that was rejected as insufficient; why is it sufficient now?

Response 17:

The February1994 PRAP issued by NYSDEC called for capping of approximately four acres within OU-1A, an area termed, OU-1. There was no remediation of OUs-2, 4 and 5 as well no groundwater treatment component in that PRAP. Phelps Dodge completed the Remedial Investigation in 1999/2000 and submitted a proposed Feasibility Study in January 2001 (which was revised and resulted in the final Feasibility Study dated May 2002). The present PRAP (November 2002) is very different than the 1994 PRAP. This PRAP calls for capping of the entire property along with a groundwater containment, extraction and treatment system.

Comment 18:

The concrete for the cap should be brought to the Site by rail rather than by truck; in particular, Ferrara Concrete is nearby and could have concrete delivered by rail.

Response 18:

The cap is expected to be constructed as part of redevelopment of the Site. Accordingly, the Site developer or developers will need to arrange for concrete and asphalt consistent with redevelopment, and overall construction contracts. It would not be appropriate for the NYSDEC to require the Site developer (or developers) to purchase concrete (or asphalt) from a particular supplier or to use a particular method of transportation. Nor would it be appropriate for the NYSDEC to impose restrictions on the transport of concrete or asphalt for redevelopment of the

Laurel Hill Site that do not apply to the development of other sites in the area or the State; such requirements would place the potential development of the Site at an unfair competitive disadvantage.

Comment 19:

Capping is insufficient to address a highly contaminated waterfront property that could further harm Newtown Creek.

Response 19:

The cap is only part of the overall Site remediation. The extensive groundwater containment, extraction and treatment system, which is an integral component of the remediation and described in more detail below, will capture and treat contaminated groundwater under the Site and prevent it from entering Newtown and Maspeth Creeks. Thus, the selected remedy will assist in improving the water quality of the Creeks. In addition, as also noted below, the NYSDEC is pursuing a separate process for investigating and, if necessary, remediating the surface waters and sediment of the Creeks as part of Operable Unit 6 (OU-6).

Comment 20:

The remedy selected must address the seepage of contaminants through the bulkhead and groundwater into Newtown and Maspeth Creeks.

The remedy must also include the construction of an impermeable bulkhead, which should be installed prior to the remediation.

What is the level of contaminants that will be allowed to remain in the treated groundwater?

Response 20:

As discussed above, the groundwater remedial system will contain, extract and treat contaminated groundwater before it enters the Creeks. The containment system includes the installation of steel sheeting along about 2,500 feet of the shoreline, thus effectively constituting a new impermeable bulkhead. The sheeting will be installed to the depth of 30 feet below ground surface and will be in place before remediation starts. The depths to groundwater range from 8 feet to 22 feet.

The groundwater extraction system was developed based on an accepted model. However, the system will need to be designed, based on additional information that will be gathered from further field-testing of the groundwater parameters that will be conducted by Phelps Dodge. The groundwater will be treated to appropriate discharge standards, which should allow the treated groundwater to be discharged either into the Creek, under a State Pollutant Discharge Elimination System (SPDES) permit, or into the City's sanitary sewer system. The monitoring of the

groundwater will be undertaken in accordance with accepted procedures. Annual Operation, Monitoring and Maintenance Reports will be submitted to the NYSDEC and will be available to the public.

Comment 21:

Why was 30 years selected as the period for operation of the groundwater treatment plant? What happens if, after 30 years of groundwater monitoring that is part of Alternative 5, the groundwater that enters Newtown and Maspeth Creeks is still contaminated?

Shouldn't monetary provisions be added to the remedy to protect the Creeks?

Response 21:

As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

The proposed groundwater containment, extraction and treatment system will intercept the groundwater and prevent it from entering the Creeks. The groundwater treatment plant will operate until the levels of contamination in the groundwater have been reduced to acceptable levels or the treatment reaches asymptotic conditions (the treatment yields no improvement in groundwater conditions). It is expected that the treatment will be successful before the 30-year period. After the system is found to be successful, the groundwater will be monitored to assure that success has been maintained. If it has not, further steps may be required. Phelps Dodge will remain responsible for completing the groundwater remediation to the satisfaction of the NYSDEC even if it sells the Site. That responsibility is part of the 2002 Consent Order executed between Phelps Dodge and the NYSDEC. Any new owner will also be responsible for continued groundwater monitoring under the Consent Order.

Comment 22:

Would subsequent construction on the Site and/or vicinity divert the groundwater away from the extraction wells and cause the contaminated groundwater to flow to the east and/or west rather than toward the Creeks?

Response 22:

The regional groundwater flow is definitely toward Newtown and Maspeth Creeks, which is the main discharge area for the lands to the north, including the Site. That pattern is very difficult to disrupt or alter. Construction on or in the vicinity of the Site is not expected to disrupt this flow pattern. The capping that will occur on the Site will significantly limit infiltration from rainwater, and thus tend to make the flow patterns more regular and normalized. In any event, as discussed above, the remedy includes a requirement for long-term monitoring of the groundwater

containment, extraction, and treatment system. The monitoring system will include surveillance wells in different parts of the Site and the placement of measuring devices called piezometers. The monitoring system would ensure that the groundwater containment, extraction and treatment system continues to perform as contemplated.

Comment 23 :

What are the criteria, if any, for trucks that would transport soil from the Site for disposal?

Response 23:

Trucks that carry contaminated waste must be licensed by the State under 6 NYCRR Part 364 and Part 374 (industrial/hazardous waste). They must meet a number of requirements to obtain a permit. In addition, transportation would have to comply with any local ordinances. The Health and Safety Plan for the Site will establish specific procedures for the trucks, as noted above, including a decontamination procedure.

Comment 24:

Why can't rail be used to transport the soil off-site, given the heavy truck traffic in the Maspeth area and the fact that rail is more economical? In addition, the New York & Atlantic Railway has indicated that it is seeking to obtain the contract for removal and disposal by rail, which would be less expensive than the use of trucks. Where do the trucks dispose of contaminated material from the Site?

Response 24:

The contaminated soil from the Site will be disposed in approved facilities that are selected by Phelps Dodge and approved by the NYSDEC. To the extent that excavated soils qualify as hazardous waste-- a specific type of waste material that generally contains the high concentrations of contaminants – the soils will most likely go to a secure burial landfill. The closest such landfills are in upstate New York or Pennsylvania. The State has a manifest system that would track any hazardous waste taken from the Site to its place of final disposal. PCB waste will go to a special Toxic Substances Control Act (TSCA) chemical waste landfill or kiln or incinerator that destroys the PCBs. The closest such facilities are in upstate New York or Alabama. If the material is contaminated, but does not constitute hazardous waste or contain PCBs, it will go to an approved and permitted non-hazardous waste landfill in New York or out-of-state.

The use of rail was evaluated during IRMs and will be evaluated again before implementing the selected remedy.

Comment 25:

A plan for managing truck traffic should be put in place for the cleanup, and that plan should have input from elected officials, local community groups and the community boards.

Response 25:

Trucks will be managed as explained in Response 24 above and more specifics on the routing will be developed as part of the Remedial Design (RD) phase of the cleanup. Community Boards 2 & 5 input will be obtained before remedial design is finalized. All approved documents produced during the Remedial Design will be placed in the official Site repositories where they are subject to inspection by the community .

Comment 26:

Do deed restrictions that are part of a remedy follow the Site, so that they are applicable to future owners?

Response 26:

Yes. Deed restrictions imposed on the current owner must be filed in the Office of the Registrar Queens County, and thus run with the Site and are applicable to future owners of the Site.

Comment 27:

Is proposed remedy consistent with all applicable NYSDEC standards and protocol? Can NYSDEC assure that the cleanup is sufficient to protect the public?

Response 27:

The investigation of the Site, the identification and evaluation of alternative approaches to remediation, and the selection of the preferred remedy were all undertaken in conformance with NYSDEC regulations (6 NYCRR Part 375) and applicable protocols, including the various guidance documents that are regularly employed by the NYSDEC to govern the Superfund process. It is the considered opinion of the professionals of the NYSDEC and NYSDOH, as further attested to by the issuance of Record of Decision, that the selected remedy (Alternative 5) is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective.

Comment 28:

What is the time frame for implementing the remedy?

Response 28:

There are several steps that the NYSDEC must take in order to implement the remedy. After the Record of Decision (ROD) is issued, Phelps Dodge will submit to the NYSDEC a proposed Remedial Design/Remedial Action Work Plan (RD/RA Work Plan) for the design and

implementation of the NYSDEC's selected remedy. This Work Plan will include the design of the groundwater containment, extraction and treatment system (including the steel sheeting to be installed along Newtown Creek and the extraction wells). The groundwater treatment system design will include such information as number of wells to be installed, pump size, size and length of piping, and other technical requirements. The RD/RA Work Plan will also identify the location for groundwater monitoring wells and the parameters to be monitored. A Work Plan for the hot spot removal will be submitted by Phelps Dodge, as part of the RD/RA Work Plan. The Work Plan(s) for remediation will include detailed Health and Safety Plans, discussed further below, that will provide for a variety of monitoring measures and precautions to be taken during the remediation process.

The NYSDEC expects to receive the RD/RA Work Plan very shortly. Approval of RD Work Plans for the hot spot removal and the groundwater containment, extraction and treatment system is expected in the spring of 2003. The hot spot removal is expected to be undertaken in summer 2003, and remedial construction of the groundwater containment, extraction and treatment system is expected to start in summer of 2003. The overall remediation is expected to take from six to eight months.

Comments Relating to the Health and Safety Plan

Comment 29:

What health and safety precautions, if any, will be taken during the remediation and during construction for redevelopment to prevent fugitive dust from blowing into the surrounding community – including dust from trucks?

Response 29:

The RD/RA Work Plan will include a detailed Health and Safety Plan (HASP) that will impose a variety of measures to minimize the creation of fugitive dust during remediation. The HASP (including the soil management plan) will impose a variety of requirements, such as: areas be watered down regularly to reduce dust creation; trucks carrying soil in or out of the Site will be covered; trucks leaving the site will be washed down to remove dust; and any soil on the Site will be placed on tarps.

In addition, the HASP will include a provision for Community Air Monitoring, which will monitor fugitive dust (particulate matter) and other appropriate constituents and require steps to reduce any potential off-site impacts from such dust if there are exceedances of the monitoring thresholds. In this regard, monitoring of particulate matter was conducted along the perimeter of the Site during the demolition activities in 1999-2000, and there were no exceedances of applicable air quality standards.

Comment 30:

How does NYSDEC assure that Phelps Dodge complies with the required health and safety measures?

Response 30:

During the remediation, the NYSDEC plans to provide periodic onsite oversight. This will help ensure that the approved HASP is followed. Also, under the HASP, Phelps Dodge will provide monitoring reports to the Department for review. Phelps Dodge will reimburse the State for the costs of this oversight.

Comment 31:

Shouldn't there be provision for topsoil on the cap, and then grass seeding where there is no construction to avoid dust and to absorb rainfall?

What precautions will be taken to ensure that the Site won't have puddles that could be breeding grounds for mosquitoes?

Response 31:

The remedial design will address issues related to site drainage, soil management and storm water management to ensure that engineering controls are in place. The HASP will impose similar obligations as stated above on the redevelopment process to minimize fugitive dust.

During remediation, the HASP in concert with the remedial design will require steps to avoid puddling. After remediation, the entire Site (other than OU-3) will be capped, with the cap designed to convey surface water runoff from the Site to avoid standing water and the formation of puddles.

Comment 32:

Air monitoring: There needs to be air monitoring during Alternative 5 to protect workers and residents. How many on-site air monitors will there be during the remediation?

Will the community have an opportunity to comment on the RD/RA Work Plan and the air monitoring plan?

Response 32:

Air monitoring during the remediation (as part of Alternative 5) is part of the Community Air Monitoring program that must be approved by both the NYSDEC and the NYSDOH. The number of air monitoring stations that will be installed during the remediation is not yet known. The number and location of such monitoring stations will be determined as part of a Work Plan, which follows the ROD. The RD/RA Work Plan is a public document that will be in the Document Repository and will be available to the community, and the community can comment on the document, including the proposal for air monitoring stations.

It is not anticipated that air monitoring stations will be installed off-site during the remediation. If the on-site monitoring stations indicate an exceedance of threshold levels, steps will taken to address the issues before there is a potential for off-site impacts.

Comment 33:

The NYSDEC and NYSDOH should install air monitors throughout the community, including Greenpoint.

Response 33:

The Department has an air monitoring station in the community, and it is located at the Maspeth Public Library. This monitor measures particulate matter in the 2.5 micron range (PM 2.5). There is another, more elaborate, site at Queens College, however it is few miles east of Phelps Dodge and is too far away to attribute any readings to a Maspeth source. There are no plans at this time to deploy any additional monitors. The installation of any additional air monitors in the community unrelated to the remediation of the Site is beyond the scope of the Superfund program, and can not be addressed in the context of this ROD.

Comments Relating to the Cost of and Payment for Remediation

Comment 34:

When the NYSDEC reviewed the alternatives in the Feasibility Study, did it review the cost estimates provided by Phelps Dodge?

Response 34:

Yes, the NYSDEC reviewed the estimates carefully. The estimates are quite detailed, and give costs for the different elements of each alternative (e.g., for Alternative 5, hot spot removal, groundwater containment, extraction and treatment, and capping) and for the long-term groundwater monitoring and cap monitoring and maintenance. The NYSDEC compared the costs for these elements of the cleanup costs for the different alternatives with comparable cleanups in the New York City area and also compared the overall costs with comparable cleanups in the State.

Comment 35:

Is the State or Phelps Dodge paying for the proposed remediation of the Site?

Response 35:

Phelps Dodge is the responsible party and it is expected that it will be funding the remediation of the Site. In accordance with the signed consent orders, they have paid for all the investigations to date. They have implemented IRMs at the cost of more than $12 million. The total present worth cost of the remedy, Alternative 5, is estimated to be $18,672,000. The cost to construct the remedy is estimated to be $12,052,000 and the estimated average annual operation and

maintenance cost for 30 years is $533,500. Phelps Dodge is expected to pay for this remedy consistent with this ROD.

Comment 36:

If a new person buys the property, who will be responsible to clean it up? Will Phelps Dodge be responsible for the cleanup of the Site if it is sold?

Response 36:

The Phelps Dodge (Laurel Hill) Site is a listed State Inactive Hazardous Waste Disposal Site and Phelps Dodge is responsible for implementing the remediation selected in the ROD. Even if it transfers the property, Phelps Dodge remains responsible for remediating the Site consistent with the ROD.

Comment 37:

What happens if Phelps Dodge does not have the money to complete the remediation of the Site or of Newtown Creek or it goes out of business? Would the State then be required to pay for the remediation under the State Superfund? If so, how does this take place, as it is generally understood that the State Superfund currently has no funding? Does Phelps Dodge have the financial wherewithal to implement the remediation?

Response 37:

It is unlikely that Phelps Dodge would not be able to pay for the remediation, as it is a multi billion-dollar entity. However, in the event that Phelps Dodge could not complete the remediation due to financial circumstances, the State would complete the remediation using State Superfund monies. Although the Superfund is currently at a low level of funding, new legislation has been proposed to re-fund the program and it is expected that the Superfund program would be adequately funded as part of next year's state budget. In any event, the State would attempt to recover as much money as possible from Phelps Dodge and any other parties responsible for the contamination through litigation by the Attorney General.

Comment 38:

There are three sites in this area already that can't be cleaned up, and there are Brownfield sites in other parts of the State that are not being remediated because the owner lacks sufficient financial wherewithal.

Response 38:

The NYSDEC is aware of two inactive sites in the Maspeth area that are listed on the Registry of State Inactive Hazardous Waste Disposal Sites. First, Quanta Resources, listed as Class 2 Site, is located one mile west at 37-80 Review Avenue and second, Roehr Chemicals, Inc, a Class 2 Site is located at 52-20 37th Street in Long Island City.

Quanta Resources, that operated a waste oil storage and processing facility, is in bankruptcy. The Attorney General's Office is conducting negotiations with numerous potential responsible parties for the undertaking of investigation and remedial activities.

Roehr Chemicals, Inc produced bulk pharmaceuticals from 1965 to 1991. In accordance with the State Superfund, Roehr Chemicals, as the Responsible Party, is undertaking remediation of the volatile organics contaminated groundwater at the Site, using a soil vapor extraction-air sparging(SVE/AS) system that was installed as an IRM and which will continue until the site is remediated.

Most Brownfield sites are not listed on the Registry of Inactive Hazardous Waste Disposal Sites , and thus there is no similar legal obligation imposed upon Responsible Parties. New York State actively encourages the cleanup and return to productive use of Brownfields.

Comments Relating to the Separate Process for Newtown and Maspeth Creeks (OU-6)

Comment 39:

Is the PRAP only for the upland areas of the Site?

Response 39:

This PRAP is for the upland areas of the Site, which constitute about 35 acres. Newtown and Maspeth Creek surface waters and sediments will be investigated as a separate Operable Unit (OU-6). However, the separate processing of OU-6 from the remainder of the Site does not in any way lessen Phelps Dodge's responsibility for any required remediation of sediments and surface waters of Newtown and Maspeth Creeks.

After completion of the Remedial Investigations and the Feasibility Study (RI/FS) in May 2002, it was clear that sediment contamination of Newtown and Maspeth Creeks necessitated further investigation. Because this further investigation would require the submission of a Remedial Investigation Work Plan and the implementation of additional sampling of water quality and sediments in the Creek, and would take additional time and effort, NYSDEC decided to split the Site administratively into two operable units: one is the on-Site, upland soils and groundwater (including OUs 1A, 2, 3, 4 and 5); the other is the off-Site surface water and sediments of Newtown and Maspeth Creeks and is referred to as Operable Unit No. 6 (OU-6).

Dividing the Site into these Operable Units allows the NYSDEC to select a remedy for the upland soils and groundwater contamination without delay while additional investigation is conducted for the sediments and surface waters of the Creeks. If the sections of the Site were continued to be processed together, there would be significant delay – probably several years - in selection of a remedy for the upland section of the Site, including remediation of contaminated groundwater now flowing into the Creeks and that, in this intervening period, continue to contribute contaminants to

the Creeks. On the other hand, separating OU-6 allows the NYSDEC to have experts in sediment contamination focus on the Creek, thus allowing that process to proceed more rapidly than it would if it were treated together with the upland part of the Site. Thus, separation of OU-6 from the remainder of the Site should allow more expeditious remediation of both sections of the Site.

Comment 40:

What steps will be undertaken with respect to contamination of Newtown Creek and Maspeth Creek for Phelps Dodge operations at the Site?

Response 40:

Phelps Dodge signed a Consent Order in June 2002 which obligates it to perform a Remedial Investigation/Feasibility Study for Newtown and Maspeth Creeks. As required by this Consent Order, Phelps Dodge submitted in early November 2002 a proposed Remedial Investigation Work Plan for additional sampling of the Creeks. This proposed Work Plan is under review by State Agencies. Field work is expected to start in summer of 2003.

Comment 41:

What is the time frame for that work and who will pay for it?

Response 41:

The remedy selection process for OU-6 will be the same as the process being followed for on-Site remediation of upland soils and groundwater. After the Remedial Investigation Work Plan is approved, Phelps will conduct the necessary sampling of the Creeks, and then submit a Remedial Investigation Report. Once that document is approved, Phelps Dodge will prepare a Feasibility Study specifically addressing the need for and alternative means of remediating sediment and surface water in OU-6. Once the Feasibility Study is approved by NYSDEC, the agency will prepare a Proposed Remedial Action Plan, which will be circulated to the public for comment. After a public meeting and comment period, NYSDEC will issue a Record of Decision.

The current schedule for OU-6 is for Phelps Dodge to complete the Remedial Investigation/ Feasibility Study for this operable unit by 2004. If NYSDEC determines that remediation of the sediment or surface water of the Creeks is required, Phelps Dodge would be responsible for implementing and paying for any required remediation.

Comment 42:

How far into the Creek would a cleanup go?

Will separating the Creeks from the rest of the Site delay any remediation of the Creeks? Newtown Creek contamination must be addressed, whether as part of the Phelps Dodge remediation or designating the Creek as a separate and independent remediation site. It should be addressed as part of the Phelps Dodge site, because there does not appear

to be any short-term plans to address the generalized contamination of Newtown and Maspeth Creeks, which affects the health of New York Harbor and residents of the surrounding community.

Is the NYSDEC committed to addressing the contamination of Newtown and Maspeth Creeks?

Response 42:

Overall Creek contamination cannot be addressed solely in the context of the Phelps Dodge Site remediation. However, the NYSDEC is currently involved in investigating and/or remediating several Superfund and oil spill sites along Newtown Creek (e.g., the Quanta Resources site), and has negotiated improvements in New York City's Newtown Creek Wastewater Treatment Plan that have already, and will in the future, result in reduced levels of contaminants (particularly metals) entering Newtown Creek. In addition, there are currently ongoing investigations of Newtown Creek as part of the NY & NJ Harbor Estuary Program initiatives.

Comment 43:

What about other companies that border the Creek; will they participate in a cleanup of the Creeks?

Response 43:

As discussed in Response 38, pollution by Quanta Resources and Roehr Chemicals is being addressed by the Department through the State Superfund Program. However, this is scarcely the end of the matter. Through the Harbor Estuary Program (HEP), the Comprehensive Conservation and Management Plan (CCMP) and other initiatives, New York State is working with other states, federal agencies and local communities to clean up the NY-NJ Harbor. Strict enforcement of existing environmental laws and regulations to protect this waterway; tracking down and stopping sources of contamination to it; and development of decontamination and beneficial use strategies for Harbor sediments are all part of the plan that has already resulted in major improvements in water quality in the Estuary. Further, the citizen's participation components of these initiatives, including the State Superfund Program and HEP, ensure that the Maspeth Community, like communities throughout the Harbor, will have a voice in what is done and how it is done.

Comment 44:

The north shoreline of Newtown Creek is created with slag (glass and metal oxide). What would that mean along the shoreline?

Response 44:

The data package from sampling in Newtown Creek along the shoreline of the Site in 1994 contains a grain size analysis, which indicates that there is a substantial quantity of fine materials along the shoreline. However, as explained above, Newtown and Maspeth Creeks need to be further investigated and that process has already commenced. The nature of the materials found

during the investigation will be taken into consideration when the NYSDEC evaluates potential remedial alternatives.

Comments Relating to the Prior Interim Remedial Measures

Comment 45:

What are the broken bricks on the Site?

Response 45:

Phelps Dodge undertook several different Interim Remedial Measures (IRMs) on the Site, which were conducted in accordance with Department approved Work Plans.

In 1986/1987, when remediation started, more than 12,000 cubic yards of contaminated soils and concrete were removed and transported off-site for disposal. During the period from September 1999 to June 2000, decommissioning of the remaining structures was undertaken, and approximately 5,200 tons of Toxic Substances Control Act (TSCA) regulated waste, 3,400 tons of hazardous waste, 4,800 tons of asbestos containing material (ACM) and 8,500 tons of non-hazardous waste were disposed of off Site. IRM activities are explained in detail in Section 4.2 of the PRAP. During IRMs, uncontaminated bricks and concrete were crushed and used as a fill in the low-lying areas of the Site and to fill building basements.

Comment 46:

Were the substructures of the former buildings on the Site removed, as large areas of the Site appear to be capped with concrete and not cleaned? Is this the cap that is contemplated by the PRAP?

Response 46:

The basements and substructures were not removed when Phelps Dodge demolished all aboveground buildings, structures and tanks that were formerly on the Site. Approximately 70% of the Site currently contains old foundations, asphalt or cement parking areas, and other impervious areas that are still intact and will remain on the Site. Although these remnants of foundations and parking areas reduce the potential for dust, they are not the cap required under the selected remedy (Alternative 5). That remedy requires a new cap with specific specifications (a minimum of 6 inches of concrete or a minimum 4 inches of road-grade asphalt over 6 inches of stone) over all of the Site except OU-3; the new cap is expected to be installed in conjunction with the site redevelopment (i.e., the foundations of new structures and ancillary parking areas would serve as a new cap). If there is no redevelopment, the cap must nonetheless be in place within four years of issuance of the ROD. The new cap will eliminate any future exposure from dust or other sources of contamination remaining in Site soils.

Comment 47:

Were explosives used for demolition of smoke stacks on Site buildings?

Response 47:

During the IRMs, the Phelps Dodge contractor was unable to obtain a New York City permit to use explosives for demolition of the former smoke stacks. Consequently, the smoke stacks were manually dismantled, brick by brick.

Comment 48:

What happened to the acid vat that was believed to be at the corner of 43rd Street and that leaked constantly?

Would there be a problem of groundwater contamination from the leaks from the vat? Does the capping affect the groundwater flow or discharge?

Response 48:

In 1999/2000, all the buildings and structures on the Site were demolished and removed from the Site. No acid vats were identified at the Site at the time of demolition.

The groundwater is contaminated from former Phelps Dodge operations. The principal contamination is metals. No indication of acid contamination has been found. However, the groundwater plume will be contained, extracted and treated before it can be discharged into Newton or Maspeth Creek. The groundwater will be drawn up into extraction wells that will be located along the shoreline, treated in a treatment plant that will be constructed, and then, after treatment, discharged into the Creek, into the City sewer system or taken off-site for disposal. The type of disposal will depend on the success of the treatment – that is, the extent of contaminants in the water remaining after treatment. The water would have to meet State standards for discharge into the Creek or New York City pre-treatment standards for disposal into the City's sewer system.

Comment 49:

There was a period during which the United States Postal Service owned the Site and no remediation was undertaken; why was that and where was the Department of Health (NYSDOH) during that period?

Why wasn't anything done about PCBs during that period, since it was known that there are serious contaminants?

Response 49:

The United States Postal Service (USPS) owned the Site from approximately 1986 to 1997. During 1986-87, remediation (as an IRM) was conducted on the property. Approximately 12,000 cubic yards of contaminated soil and concrete had been excavated and disposed off-Site. During

the removal, it was discovered that soil with elevated levels of contaminants were below the ground water table, which required an evaluation with regard to potential impacts to the groundwater. When the Postal Service bought the Site, after its own sampling, there had been no discovery of PCBs. PCBs were not discerned on the Site until later.

No additional remediation occurred during the Postal Service's ownership, apparently due to certain issues between USPS and Phelps Dodge. However, Phelps Dodge is the current owner of the Site and has committed to implement Alternative 5.

The NYSDOH has worked in partnership with NYSDEC on this site since the 1980s. The NYSDOH was involved in evaluating the remediation conducted in 1986-87 and the adequacy of additional sampling conducted for the RI. The PRAP was proposed by NYSDEC in consultation with the NYSDOH.

Comments Relating to Possible Redevelopment of the Site

Comment 50:

Does the NYSDEC know of any redevelopment plans for the Site?

Response 50:

The NYSDEC does not have knowledge of any redevelopment plans. Under the Consent Order between Phelps Dodge and NYSDEC, Phelps Dodge is obligated to inform NYSDEC of its plans to sell the site. The agency does know that an entity called Crossroads Realty (2000) Corporation, Inc. owns OU-3 and that an entity called Sagres Partners LLC has entered into a contract with Phelps Dodge to acquire the remainder of the Site. Regardless of any redevelopment, the remedy required in the ROD must be implemented and the monitoring of the cap and groundwater must be undertaken.

Comment 51:

Phelps Dodge should provide the community with access to the waterfront, as a form of "restitution" for its years of polluting the Site and subjecting the community to pollutants.

After the remediation is completed, will the Site be clean enough to allow people to go out on a walkway along the shoreline of Newtown Creek, consistent with New York City's plans to recapture open space along the waterfront or if a user like Home Depot develops on the Site and that use entails public access to the waterfront under City zoning? When would that happen?

Response 51:

The NYSDEC does not have the authority under the State Inactive Hazardous Waste Disposal Site Program (State Superfund) to require Phelps Dodge, or any other owner of a listed Superfund

site, to make "restitution" to the community. It only has the authority to direct the responsible party (here Phelps Dodge) to implement a cleanup. The remedy selected by the NYSDEC would, as discussed above (and in more detail in the ROD and Feasibility Study), be protective of public health and the environment.

Comment 52:

The development of the Phelps Dodge Site should include construction of a promenade along the Newtown Creek shoreline.

Will the cleanup of Newtown and Maspeth Creeks prevent public access to them and, if so, for how long?

Response 52:

NYSDEC is aware that conceptually the Phelps Dodge Site will be used for industrial/commercial enterprise. We are unaware if a promenade will be a part of the end use or whether the site owners will be allowing for public access to the creeks on their property. Currently the site is fenced and public access to the creeks is restricted.

Miscellaneous Comments

Comment 53:

Does the Site have an impact on the Brooklyn-Queens Aquifer, which is under the Site? Would the proposed remedy affect that Aquifer?

Response 53:

Although the Brooklyn-Queens Aquifer is under the Site, the area of the Aquifer is not used to supply potable water. The wells that are used are far removed from the Site (about five miles). The wells used to withdraw water from the Aquifer for potable use are much too distant from the Site for any drawdown effect from those wells to influence Site groundwater. Moreover, the groundwater flow system at Phelps Dodge was investigated during the RI and Newtown/Maspeth Creeks were found to be the discharge area. Although the proposed remedy would not affect the Aquifer, it would improve groundwater quality under the Site and the quality of water that would reach the Creeks and, ultimately, the East River.

Comment 54:

Community Relations: **The NYSDEC should engage in regular meetings with the Queens Borough President, Community Boards # 2 and #5 and community groups as the process moves forward.**

Response 54:

The NYSDEC will ensure that Phelps Dodge continues to comply fully with the Citizen's Participation (CP) requirements of the Inactive Hazardous Waste Disposal Site Remediation

Program (6 NYCRR Part 375-1.5) and related CP guidance for the program. Phelps Dodge prepared a Citizen's Participation Plan (dated March 1990) and Addendum (dated December 1999) for the Laurel Hill Site that outlines CP activities through this Record of Decision. As part of the RD/RA process, Phelps Dodge will amend this CP plan to ensure appropriate community participation during the design and implementation of the selected remedy. At least one public meeting will be held before remedial construction begins (i.e. when the remedial design is essentially agreed upon). Other contacts with the community will be spelled out in the amended CP plan. Outputs developed by Phelps Dodge under the Remedial Program for the site, of course, will continue to be placed in the document repositories.

Comment 55:

There has been too much delay. The NYSDEC should proceed promptly to approve the cleanup plan for the Site, develop and implement a plan to remediate Newtown Creek.

Response 55:

The issuance of the ROD for the Site is the approval of a cleanup plan for the Site. As discussed earlier, the process for investigating and developing a remediation plan for Newtown Creek, if warranted, is underway.

Comments Relating to Public Health Issues

Comment 56:

Did the assessment with regard to public health consider volatilization and inhalation of PCBs?

Response 56:

The exposure assessment considered the potential for exposure to PCBs after Site remediation. Because the soils with the high concentrations of PCBs will be removed and the entire Site (except OU-3) will be capped, any potential pathway for exposure will be eliminated. (As noted earlier, the Site is currently covered over 70% of its surface by asphalt or concrete, so that even the current potential for exposure is quite limited.)

Comment 57:

What steps, if any, are being taken to protect local residents over the next 30 years? A survey of residential areas in the vicinity of the Site should be conducted.
An environmental study throughout a one-mile radius of the Site should be conducted.

Response 57:

The remediation selected by the NYSDEC, Alternative 5, will eliminate the principal potential routes of exposure of the community to Site contaminants. As discussed earlier, there will be a HASP for the remediation process and a Construction HASP for any redevelopment of the Site.

The selected remedy (Alternative 5) provides for groundwater monitoring for up to 30 years, to ensure the effective operation of the groundwater containment, extraction and treatment system. The cap must be maintained and inspected annually and certified as to its effectiveness by a licensed engineer on an annual basis. Additional institutional controls will also be imposed to limit potential disturbance of the Site.

In light of this remediation and long-term protections, the selected remedy does not include an off-site study or survey of residential areas. Further, the closest home to the Site is about ¼ mile away, and upgradient in regard to groundwater.

Comment 58:

Has the NYSDOH conducted health studies of existing conditions in the area, especially for heavy metals (especially lead) and PCBs, given the serious nature of the Phelps Dodge contamination?
Is there cancer data for the area, specifically the area within a mile of the Site?
Could citizens petition the NYSDOH for a survey?
Is there information about retardation levels in children living in the area?

Response 58:

The NYSDOH has not conducted a specific health survey of the area or tested individuals for elevated levels of lead or PCBs. Such surveys or similar studies (such as the environmental study requested) are not generally undertaken for State Superfund sites. In addition, the only disease for which there is enough information to seek to ascertain any correlation is for cancer. Cancer maps, which are maintained on the basis of zip codes, are available on the NYSDOH web site or from the NYSDOH itself. Members of the public can petition the NYSDOH to conduct a cancer study (as was done in Nassau County in Long Island). The NYSDOH does not keep statistics on retardation in children; it is possible that this information is available through the State Department of Education of the New York City Board of Education.

The role of the NYSDOH under the State Superfund law is to focus on existing routes of exposure to the public health and to assure that a selected remedy eliminates or minimizes such exposure. In this case, the selected remedy eliminates human exposure to contaminants in the soil and groundwater on and under the Site. The NYSDEC will be assessing the risk of any contamination of the surface waters and sediments of Newtown and Maspeth Creeks, and the NYSDOH will be involved in the assessment of any remedies proposed for such contamination.

The NYSDOH does monitor the incidence of cancer across the state and that information is available on their Website http://www.health.state.ny.us/nysdoh/cancer/csii/nyscsii.htm. However, the NYSDOH has not specifically studied the incidence of cancer in relationship to the Phelps Dodge site.

Comment 59:

Are NYSDEC and NYSDOH aware that there is subsistence fishing on the Brooklyn side of Newtown Creek? Why are there no signs warning of the dangers of eating fish or crabs from the Creeks?

Response 59:

NYSDOH issues advisories on eating sportfish and game because some of these foods contain chemicals at levels that may be harmful to health. Besides general advice to eat no more than one (half-pound) meal per week of fish from New York State freshwaters and some marine waters near the mouth of the Hudson River, DOH issues more restrictive advisories for waters with fish contamination problems. NYSDOH publishes a list of waters with restrictive fish advisories and other information in its publication, "Chemicals in Sportfish and Game, 2002/2003 Health Advisories". The East River is on this list of waters with restrictive fish advisories, due to fish PCB contamination.

These restrictive advisories apply to listed waters (including the East River) and their tributaries, upstream to the first barrier impassable by fish. Since Newtown and Maspeth Creeks are tributaries of the East River, the East River fish advisories also apply to Newtown and Maspeth Creeks. This advice is for women of childbearing age and children under the age of 15 to EAT NO fish from the East River (and Newtown and Maspeth Creeks), and for other people to EAT NO American eel; EAT NO MORE THAN ONE MEAL PER MONTH of Atlantic needlefish, bluefish, striped bass and white perch; and eat no more than one (one-half pound) meal per week of other fish from these waters. Statewide advice to EAT NO crab or lobster hepatopancreas (also called mustard, tomalley, or liver) also applies to these and all other New York State waters.

The Phelps Dodge Site is closed to the public, and is fenced in, so there should be no fishing from that property.

The New York City Department of Health is currently exploring the feasibility of posting fish advisory signs at New York City fishing locations, which could include the Brooklyn side of Newtown/Maspeth Creeks.

APPENDIX B

Administrative Record

APPENDIX B

Administrative Record

1) "Site Evaluation, Preliminary Report, Queens General Mail Facility", Sverdrup-Gilbane, February 1985

2) "Site Evaluation, Supplemental Study Report, Queens General Mail Facility", Sverdrup-Gilbane, May 1985

3) "Soil Investigation Results, Laurel Hill Works", Hart, March 1986 (Hart 1986a)

4) "Remedial Action Plan, Laurel Hill Works", Hart, October 1986 (Hart 1986c)

5) Soil Boring Program Report, October 1987, Phelps Dodge Laurel Hill Works", Hart, December 1987 (Hart 1987b)

6) Draft Assessment of Groundwater Conditions at The Phelps Dodge Laurel Hill Works Facility", Hart, April 1988 (Hart 1988a)

7) "Evaluation of Remedial Action Alternatives For The United States Postal Services", Hart, November 1988 (Hart 1988c)

8) Supplemental Remedial Program", CRA, July 1989

9) Phase I -- Hazardous Waste Site Assessment", Rizzo, December 1990

10) "Asbestos Investigative Survey Report, Phelps Dodge Refinery", Hygienetics, Inc., (no date but work done during period of December 13, 1990 to January 9, 1991)

11) "Supplemental Remedial Program, Final Report", CRA, March 1992 (CRA 1992a)

12) "Focused Feasibility Study", CRA, July 1992 (CRA 1992b)

13) "Remedial Design Report, Plan of Final Closure", CRA, September 1993

14) "Phase II Environmental Site Assessment, Final Draft Report, Phelps Dodge Site, Queens New York, Contract SM -- 64C", HydroQual/EEA, A Joint Venture, March 1994

15) "Capital Project No. WP -- 284, Land--Based Sludge Management Plan, Contract SM -- 102 -- Phelps Dodge Composting Plant, Task 11.4, Feasibility Study Site Remediation", Malcolm Pirnie/Hazen and Sawyer, A Joint Venture, May 1994

16) "Current Conditions Report", CRA, December 1997

17) "Addendum I, Current Conditions Report", CRA, April 1998

18) "Preliminary Site Assessment Work Plan for Operable Units 2, 3, 4, and 5", CRA, July 1999

19) "Demolition and Back/Grading and Filling Work Plan (Operable Units 1A, 2, 4, and 5)", CRA, September 1999

20) "Preliminary Site Assessment Report", CRA, February 2000

21) "Remedial Investigation Report (Operable Unit 1A)", November 2000

22) "IRM/Demolition and Backgrading Final Report", CRA, December 2000

23) "Supplemental Preliminary Site Assessment Report (Operable Units 2, 4, and 5), CRA, December 2000

24) “Feasibility Study Report (Operable Units 1A, 2, 3, 4 and 5), CRA, January 2001

25) “Feasibility Study Report (Operable Units 1A, 2, 3, 4 and 5), CRA, May 2002